of the district; but two other *Cracinæ* (*Nothocrax urumutum* and *Mitua tuberosa*) are likewise met with. The only *Penelope* we have seen from the Upper Amazon is *P. boliviana*; but *P. sclateri* is probably from the Bolivian branches of the same river. The widely spread *Pipile cumanensis* also occurs in more than one locality in this region. The *Ortalidæ* are *O. guttata* and *O. caracco*.

8. Wood-region of South-east Brazil.

In this and the following district, which are closely connected, and, as we believe, altogether divided from the great Amazonian forest-region by intervening campos, we meet with an entirely new set of *Cracidæ*. In the wood-region of Brazil, which we are now considering, *Crax carunculata* is the sole representative of the *Cracinæ*. Three species of *Penelope* occur—*P. jacucaca*, *P. jacupeba*, and *P. superciliaris*. *Pipile* is represented by *P. jacutinga*—very distinct from the two Amazonian species. Of *Ortalida* two species, at least, are met with:—*O. albiventris*, in the vicinity of Bahia; and the nearly allied *O. squamata*, probably in one of the more southern provinces. Of *O. ruficeps*, attributed to this district, we do not know the exact locality.

9. Paraguay and adjoining wood-region of the interior of Brazil, situate on the Upper Paraguay and Parana.

In this district *Crax sclateri*, *Penelope obscura*, and *Ortalida canicollis* represent their respective genera; but *Penelope ochrogaster*, discovered by Natterer near Cuyaba, probably also belongs to it.

June 23, 1870.

Professor Flower, F.R.S., V.P., in the Chair.

The following extract was read from a letter addressed to the Secretary by Dr. John Anderson, C.M.Z.S., dated Indian Museum, Calcutta, May 4th, 1870:—

"When I wrote to you about the Dolphin of the Irawady*, and mentioned *Globiocephalus*, I had not examined the specimen attentively, and had been misled by Blyth's identification of two almost similar specimens in this museum. But on going into the subject I found that he had confounded two very distinct forms, and had regarded as the young of his *Globiocephalus indicus* a small full-grown Dolphin (the *Phocæna brevirostris* of Owen). I have written fully on this subject in my 'Mammals of Yunan.'"

Mr. Howard Saunders, F.Z.S., exhibited and made remarks upon some nestlings of the Booted Eagle (*Aquila pennata*) from Southern Spain.

Dr. Murie read a memoir on the anatomy of the Walrus (*Tri-*

* See P. Z. S. *antea* p. 220.

chechus rosmarus). After a preliminary notice of the labours of Daubenton, Home, Von Baer, and others, he proceeded to treat on the outward characteristics of the young male *Trichechus* which the Society possessed in 1867. Dwelling respectively on the colour, general configuration, manner of walking, skin-folds, and head, he closed this section by a careful study of its pectoral and pelvic limbs as compared with those of *Phoca*. With a few remarks on viscera and genital organs, he more fully described the vascular channels and the vocal organs, verifying Von Baer's observation as to the diminutive size of the epiglottis. Of the myology nothing heretofore has been known save Sir Everard Home's incidental notice of the Walrus possessing well-developed interossei. Dr. Murie having dissected somewhat minutely the fleshy structures, proceeded to point out that though the genera *Trichechus*, *Otaria*, and *Phoca* manifest considerable variety in form, gait, and degree of limb-movement, they, nevertheless, muscularly present general agreement. In the presence of a coraco-brachialis, a flexor brevis manus, a pronator quadratus, an opponens pollicis, and a palmaris brevis, the Walrus is differentiated from the Eared and Earless Seals. Though deficient in concha, the auricular muscles are remarkably large. There is an external anconeus as in *Otaria*; and, as in it and *Phoca*, there are a double set of extensors of the manus. Compared with Seals, there are two extra peronei and a flexor brevis hallucis.

This paper will be published in full in the Society's 'Transactions.'

The following (5th and 6th) letters on the ornithology of Buenos Ayres*, addressed to the Secretary by Mr. W. H. Hudson, C.M.Z.S., were read :—

(No. V.)

"Buenos Ayres, March 22, 1870.

"My dear Sir,—In a letter, dated a few days back, I gave you some account of the *Tænioptera variegata*. This bird, a Plover in habits and a Thrush in appearance, finds a congenial habitat in this part of the country when the cold compels it to forsake the barren plains of Patagonia. Before winter sets in, the giant thistles that cover the plains in summer dry up and crumble to dust, and, the grass being eaten down very close by the innumerable flocks of sheep, the earth presents all the smoothness so agreeable and so necessary to this species.

"Even at night they do not seek for shelter, as do the Trupials, *Anthi*, and other passerine birds that roost on the ground, but, Plover-like, remain on the bare level places they frequent. I do not recollect ever having met them on the grassy pampas west of the Buenos-Ayres frontier. As they do not perch on reeds, they would naturally avoid such places, preferring the inhabited districts. Thus the settlement of the country has been favourable to this species, as it has to the Biscacha, the Burrowing-owl, and the *Téru-téru*.

* For Mr. Hudson's last letter, see P. Z. S. 1870, p. 332.

"The White Tæniopteras perch and roost in reeds and bushes; they avoid the open level ground, and frequent rough stubbles, reedy swamps, and plantations, also plains where the cardoon abounds. I have been told by old men that the *Tænioptera coronata* was in this district a very common bird fifty years ago, when the long grasses had not been destroyed, and that they bred here. This is easy to believe; for as soon as we pass into the long-grass region this bird becomes quite common. I have met with great numbers of them 200 miles west of Buenos-Ayres city; and when outside the frontier I frequently noticed the *T. coronata* gathering from all sides and following our party, probably from curiosity, as human forms must have been strange to them in such a place.

"They have no regular migration, as they are seen at all seasons in the regions they inhabit; but in the settled districts, where there are none in summer, stragglers are always found in winter. Several years ago great numbers of them came; and it was amusing, on still mornings, to watch the dogs thrown into the greatest excitement by their long low whistling notes, sounding from all sides. From this peculiar note the bird is commonly called the *Buellero* (ox-driver).

"The *T. dominicana* much resembles the last in habits, but in winter goes in flocks. When flying it is a pretty bird, from the contrast of its black wings, tipped with white, with the pure white of its body. There are dull black and grey markings on the upper plumage of the young bird; but of all the adults I have shot, both in summer and winter, the plumage on the body of the male was entirely white, the upper plumage of the female a light grey. Some individuals breed in the vast reed-beds along the Plata; but as these are few, probably most of the flocks seen in winter visit us from more distant regions.

"The *Tænioptera irupero* is smaller and much rarer than either of the preceding species. From its snowy-white plumage and jet-black bill, feet, and quill-tips, giving it a mourning appearance, it is called here *Viudita*, or 'Little Widow.' With the exception of a pair of these birds which I discovered last summer, it has always been in winter that I have met with them. A single individual sometimes appears in this season, and haunts the same spot during its stay, invariably alighting on the same tree or shrub and disappearing at the approach of spring. Still, I cannot say that it is a winter visitor; as it is so rare a bird at all times, it might easily escape observation in the laying-season without leaving the country.

"The three white Tæniopteras I have described perch on reeds and thistles, are fond of isolated shrubs, but avoid trees growing near together. They resemble each other closely in their feeding-habits. Like some Flycatchers they watch for insects from a stand, to which they frequently return after leaving it; but they do not, like the Flycatchers, watch for their prey in the air above and around them, but gaze down intently on the ground, as the Kingfisher does on the water. When they have discovered an insect they dart down and seize it, and proceed to kill and devour it on the spot, returning afterwards to their perch. When opened, their stomachs are found

to contain a large proportion of coleopterous insects. I think it very probable that the vast unexplored regions lying between the grassy pampas and the Andes will be found to be the native country of these birds. I haver never met here with any specimens of the *Tænioptera nengeta*.

" To see the webs of the Gossamer-Spiders floating in the air is here an exceedingly common thing. These little aëronauts are so numerous that on any still day in warm weather, if one sits down on the grass, he will observe numbers of them briskly moving about, while some, running to the point of a blade or leaf, suddenly dart out their invisible lines and float off. I recollect once, several years ago, the sky was for several days full of white masses composed of these floating webs. But this afternoon, while I was out shooting, these Spiders and their webs presented an appearance that was altogether new to me. Walking along a stream I observed skirting the edge of the low wet ground on the opposite side a broad white line. This I discovered to be caused by the quantities of gossamer that almost completely veiled the grass and thistles under it. This zone of gossamer was about twenty yards wide; and outside of it only a few scattered webs were visible. I did not ascertain its length, but followed it about two miles without finding its end. I enclose a small strip of the webs, which could be easily peeled off every object presenting a smooth surface. I observed many of the Spiders; indeed so numerous were they that they continually baulked each other in their attempts to rise in the air. There being a breeze blowing, as soon as one threw out his web it would be entangled in that of another. Both Spiders would immediately seem to know the cause of the trouble, for they would run angrily together, each trying to drive the other off. There appeared to be at least three different species of Spider. One of these had a round scarlet body; another, of a velvet-black, had a square large corslet and small pointed abdomen. But the greatest number were of the third kind; they were all shades of olive colour, from pale green to greenish black, and of various sizes, the largest being in body a quarter of an inch long. These Spiders could not have been brought by the wind, as the zone of webs followed the windings of the stream, but had probably bred in the low ground along its margin and had now gathered on its edge ready to migrate.

" 27th. On the 25th I went to visit the Spiders I have spoken about, fully expecting they would be gone, as we have had wind and rain since I first saw them. To my surprise they were vastly increased in number; on the tops of cardoons they literally were in heaps. Most of them were large and of the olive-coloured species, and were floating off in great numbers, the day being calm. I noticed another kind, of a pale slate-coloured body elegantly striped with black, and pink legs. On the 26th I went again to see them; and the whole army of Spiders, save a few solitary stragglers, had disappeared.

" Very truly yours,

" William H. Hudson."

(No. VI.)

" Buenos Ayres, April 11, 1870.

" My dear Sir,—The Blackbirds, *Pajaro negro* (*Molothrus bonariensis*), with characteristic irregularity, often leaving us at the end of March, apparently for good, have again appeared this year in great numbers. When summer is over these birds congregate in vast flocks, and are then seen for many days flying north ; but it is not probable that they migrate to any very great distance. They pass with a rapid, low, undulating flight, one flock behind the other, their wings producing a soft and agreeable sound. The Blackbirds feed on the ground, following the plough in spring to pick up the worms, and are fond of keeping round cattle in the pasture, frequently alighting on their backs. The song of the male is, when wooing, accompanied by strange gestures and actions. Swelling and ruffling his feathers like a turkey-cock, and frequently suddenly taking wing and flying directly away from the female, and performing a wide circuit round her in the air, he sings all the time. The song begins with remarkable hollow, internal notes, ending with others loud and clear. The female is homely in appearance in her dull mouse-coloured suit, and has no song but a low chattering, not often uttered, and always appears very indifferent to the advances of her beautiful glossy partner. In the evening, when they settle on the trees to roost, they sing until it is quite dark. From their great numbers, their singing at such times often sounds like the rushing of a strong wind among the trees. When disturbed on their roost at night the males repeat their song as they take wing ; they also settle on the trees on rainy days to sing, continuing their concert for hours. One of our marsh-Blackbirds, the *Chrysomus frontalis*, possesses this habit of singing while it is raining ; its song begins with a low mourning note, to which succeeds a long, soft, plaintive whistle; this is followed by others, short and in rapid succession as they rise, growing longer as they sink again, until they die away. This song heard in wet and gloomy weather has an indescribably sweet and melancholy effect. But to return to the common Blackbird ; the most remarkable thing about this bird is its manner of reproduction ; and this would be a very interesting subject of study to the philosophic naturalist. It is well known that, like the European Cuckoo, it deposits its eggs in the nests of other birds. But the Cuckoo lays but one egg in a nest, and its peculiar habit possesses one thing in common with the instincts of other animals; it is regular and definite, ensures the safety of the young, and, for all that has yet been established to the contrary, is unchangeable as are the laws of matter and force. The instinct of the Blackbird is, on the contrary, unsettled and indefinite and truly a 'monstrosity.' It is as if the true instinct had been partially eradicated or disfigured, so that its traces appear in various modes and degrees of intensity in different individuals—strong enough, though deformed, in some to secure the safety of the young, in others so dim and uncertain as to make reproduction impossible. Had Darwin been well acquainted with the habits of this bird he

certainly would have given it a distinguished place in the 'Origin of Species;' and he could not have found any more remarkable case for illustrating the 'mistakes and imperfections to which instinct is liable,' and which he considers favourable to his theory.

"There are few small birds here into whose nests the female Blackbird does not intrude; and great is the domestic confusion introduced by her visits. She does not choose nests for their size or for their architects being hard or soft-billed birds, but lays her eggs indiscriminately wherever she can. I have never found her eggs in the nest of the *Churinche* (*Pyrocephalus rubineus*), probably because that pugnacious little bird remains by it and is able to beat her off. I have also observed that the Blackbird never lays in domed nests, though parties of them are constantly seen about the *ovens* of the Oven-bird (*Furnarius*), climbing over, peering into, and even entering and examining them very curiously. It would be difficult to enumerate all the little birds who are compelled to rear the young Blackbirds; but their favourite nests, probably because easiest discovered, and undefended against their intrusion, are those of the *Cachila* (*Anthus correndera*), the *Chingolo* (*Zonotrichia pileata*), the *Jilquero* (*Chrysomitris barbata*), the *Tijereta* (*Milvulus violentus*), and the Yellow-breast (*Pseudoleistes virescens*).

"The nests of the last two are particularly preferred; indeed I seldom find a nest of either of them but it contains more eggs of the Blackbird than of the rightful owners, while from one or two to half a dozen female Blackbirds are usually to be observed near it.

"They frequently begin depositing their eggs before the nest is finished, upon which it is generally abandoned; and often so many eggs are laid in a nest, that, even if they are set on, few or none of them can be hatched. The nest of the *Tijereta* is usually found with from five or six to a dozen Blackbird's eggs in it, that of the Yellow-breast, which is deeper, with from fifteen to twenty; but what the nest contains are seldom all the eggs that have been laid in it; for, by looking on the ground under the tree or bush, many more will frequently be discovered, thrown down by the female Blackbird. Another destructive habit of this bird (destructive to its own increase as well as to that of other species) is its habit of pecking holes in the eggs it finds in the nest where it lays. This is not a fixed, invariable habit, but irregular, as are its reproducing-instincts. Sometimes the shells are so broken that the yelk is spilt in the nest; at other times they peck small holes in the shells; and sometimes they strike their bill into one egg and fly away with it, as a Pigeon does with the shell of an egg it has just hatched. This I have seen them do; and I have often found an egg with a hole in it several feet from the nest, doubtless removed in this way. Some nests are found containing a dozen or twenty eggs, every one with holes pecked in them. In the laying-season each female is generally attended by one or two, and sometimes three males, who quietly remain near while she is on the nest. The Blackbird also drops its eggs on the ground; and I continually find these lost eggs on ploughed fields, roads, and spots of barren earth.

"I do not know that these birds ever make a complete nest; but that they sometimes commence to build one I am certain. I once observed a flock of seven or eight Blackbirds busily flying to and from a clump of young giant thistles. On going to the spot, I found they had begun to build a large nest on a broad, horizontal leaf, very much exposed to sight. No other bird would have chosen such a frail foundation to build upon; for, however large and stiff these leaves are, they rapidly shrink up as the plant grows; and this one would certainly have dropped its burden within ten or fifteen days. The nest was made in a very slovenly manner, being composed of large sticks, rags, and other things, piled without any regularity; the birds fluttered round as if anxious for its safety while I examined it, and resumed their work as soon as I withdrew; but after two days they suddenly forsook it. I have since observed another flock of Blackbirds begin a nest, in a poplar tree; but this was also left unfinished.

"In autumn, when the Blackbirds congregate in flocks of tens of thousands, so that the ground where they feed seems carpeted with black, and the trees where they alight to have a black foliage, I often wonder that the little birds in whose nests they lay do not become extinct, or all but extinct, by their means. Though I have been familiar with this bird since I was a child, when I used to find its 'lost and wasted eggs' on the walks, and remove them in pity from the nests of little birds, I have not yet ceased to wonder at its habits. How strange that it should be so disorderly in the midst of the general order of nature! Or must we come to consider these habits of the *Molothrus bonariensis* 'not as especially endowed or created instincts, but as small consequences of one general law,' namely, transition?

"Truly yours,

"WILLIAM H. HUDSON."

The following papers were read:—

1. On some recent Additions to the Avifauna of Mexico. By P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN, M.A., F.L.S., &c.

A series of birdskins recently submitted to our examination by M. A. Boucard, of Paris, contains some examples of Mexican birds, obtained by one of his correspondents in Southern Mexico, which have not previously come under our notice in collections from that country. There are five species, concerning which we have the following notes to communicate:—

1. TURDUS FLAVIROSTRIS, Sw.

An adult female of this fine Thrush from San Juan del Rio, a town in the centre of the state of Oaxaca. It appears to be a western species exclusively.

2. Geothlypis melanops, Baird, B. N. A. i. p. 241.

A fully adult male of this *Geothlypis*, which Prof. Baird has recently separated from *G. trichas*. The exact locality of the specimen is not given. Sclater's collection contains a similar example from some part of Mexico, hitherto confounded with *G. trichas*. There can, we think, be no doubt of the validity of this species, which (as Prof. Baird also notes, *l. c.*) is quite distinct from *G. speciosa*, Sclater. Of the last-named bird, Sclater's typical specimens are still unique.

3. Thryothorus pleurostictus, Scl. Cat. A. B. p. 21, pl. iv.

This species has not before been sent from Mexico, and only one (the type) specimen from Guatemala. Several examples, however, have been forwarded from Costa Rica during the last few years.

4. Cyanospiza leclancheri.

Passerina (Spiza) leclancheri, Lafr. Rev. Zool. 1841, p. 260, et Mag. de Zool. 1841, Ois. pl. 22.

Spiza leclancheri, Bp. Consp. i. p. 475.

A pair of this charming species from San Juan del Rio; the first we have yet met with.

Lafresnaye described and figured the male of this Finch from an example obtained by M. Leclancher, one of the officers of the 'Venus,' during the expedition of that vessel, near Acapulco. The female does not differ materially from the male, except that the coloration of the plumage is of a less brilliant tint.

5. Morococcyx erythropygia (Less.): Scl. Cat. A. B. p. 322.

One skin of this Cuckoo from San Juan del Rio; the first Mexican specimen met with, except an example in the Museum of the Academy of Natural Sciences of Philadelphia, U. S. A. (examined by Sclater in 1856), which was procured near Mazatlan by Mr. Bell of New York.

2. Notes on *Gracula kreffti*.

By John Brazier.

During my visit to the Solomon Islands along with my friend Sir William Wiseman in September 1865, we obtained six living examples of the Grakle recently described by Mr. Sclater (P. Z. S. 1869, p. 120) as *Gracula kreffti* at Ysabel* or Isabel Island (as some writers please to call it). This was the only island in the group in which we met with it. These birds were bought of the natives. On my visit to the mountains I saw plenty of the same species, but I found it impossible to get within gun-shot of them. This Grakle is a bird that is almost always on the wing, and frequents the mountains of the island, never the low land. How the natives take them alive is a question. When in captivity they soon become tame. The natives bring them off

* In Mendana's 'Voyages' it is called Santa Ysabel.

on a hoop tied with a string to one of their legs. When brought on board they were fed with boiled rice and table-raisins, and throve exceedingly on their new food. While we remained in the Tropics the birds were in good health, but when we got into colder latitudes began to fail. When we arrived in Sydney two were presented to the Zoological Collection in the Botanic Gardens, but died in about a week's time. So far as I can remember, our own all died at last and were taken to London in skins when the 'Curaçoa' returned to Portsmouth. There has been a specimen of the same bird in the Sydney Museum for years; but no name nor locality was attached until this last month or so.

3. On a Collection of Birds from the Island of Trinidad. By Dr. Otto Finsch, C.M.Z.S.

Mr. Kohlmann, a schoolmaster of Vegesack, has kindly placed in my hands for determination a collection of birds from the Island of Trinidad, brought home by a captain of a vessel belonging to this small port on the Weser.

Though birds of this well-explored island* are rather common in collections, the first account of its rich avifauna did not appear before 1864, when Mr. E. C. Taylor (Ibis, pp. 73–97) published his interesting article (Five Months in the West Indies. Part I. Trinidad and Venezuela), enumerating 141 species, chiefly belonging to the Island of Trinidad. Two years later we got a work specially devoted to the birds of this island from the pen of Dr. A. Léotaud†, a French ornithologist, whose praiseworthy zeal and intelligence manifested signs of still greater progress, but who, unfortunately, died scarcely one year later (*vide* Ibis, 1867, p. 256). From my acquaintance with this work, which was "publié par souscription nationale," I am enabled to say that it is one of the best of its sort ever published in a country where the sources of science are more than usually meagre, and where especially bibliographical material is by no means near at hand. Nobody, therefore, will feel inclined to criticise the author for being here and there mistaken in the correct appellation of the species, and still less since the descriptive portion of the work and the accurate measurements prove him to have been throughout an excellent practical observer.

Dr. Sclater has already corrected some of the errors in his valuable remarks on Dr. Léotaud's book (Ibis, 1867, pp. 104–108); and in the course of the following pages I shall be able to add some further corrections. The results of my endeavours will be, I believe, of

* A brief sketch of its avifauna has been given already by Dr. Hartlaub; Über den heutigen Zustand unserer Kenntniss von Westindiens Ornithologie (Isis, 1847, p. 614).

† Oiseaux de l'île de la Trinidad (Antilles); par A. Léotaud, Docteur en Médecine de la Faculté de Paris, Membre Correspondant de la Société de Médecine de Gant. Port d'Espagne: Chronicle Publishing Office, 1866.

some interest, as I have compared the specimens received from Trinidad with others from different parts of America, especially of the neighbouring mainland of Venezuela and Guiana. The total number of species recognized as found in Trinidad by Dr. Léotaud is 297—a number evidently too low, because Dr. Léotaud apparently enumerates only those species met with by himself. If he had had an opportunity of consulting other reliable works on South-American ornithology besides the few cited by him, he would have found a considerable number of species to add to his list. The valuable Catalogue of American Birds in the collection of Dr. Sclater (1862) contains thirty species from Trinidad not included in Dr. Léotaud's work. Mr. Taylor notices thirteen species more, and I myself am able to add ten additional species; so that the total number of species now amounts to about 350. Further investigations will most probably increase this number; for Trinidad, situated close to the mainland, and being "nothing more or less than a bit of Venezuela," as Dr. Sclater very aptly remarks, undoubtedly becomes visited accidentally by many birds proper to the continent, besides a portion of stragglers from the northern parts during the winter season. The only species peculiar to the avifauna of Trinidad seems to be *Psittacula cingulata*.

The collection received by Mr. Kohlmann contains 115 species, of which the following are new to Trinidad:—*Heleodytes minor*, *Myiozetetes inornatus*, *Sturnella hippocrepis*, *Pseudoleistes melanicterus*, *Icterus vulgaris*, *Cardinalis phœniceus*, *Sycalis brasiliensis*, *Ramphastos erythrorhynchus*, *Pteroglossus araçari*, and *Brotogerys tuipara*.

The Catalogue of Dr. Sclater contains the following species marked with Trinidad:—

	Sclater, Cat. page
Mimus melanopterus, Lawr.	9
Heleodytes griseus (Sw.)	16
Thryothorus rufalbus, Lafr.	20
Anthus breviunguis, Spix	24
Euphona flavifrons (Lath.)	56
Calliste cayana (L.)	66
?*Tanagra glaucocolpa*, Cab.	75
Arremon silens, Bp.	93
Orchesticus ater (Gml.)	98
Emberizoides macrourus (Gml.)	118
Chrysomitris cucullata (Sw.)	123
Sycalis columbiana, Cab.	126
Icterus auricapillus, Cass.	132
Sturnella meridionalis, Scl.	139
Synallaxis albescens, Temm.	150
Phacellodomus frontalis (Licht.)	154
Picolaptes squamatus (Licht.)	166
Pyriglena maculicaudis, Scl.	185
Pitangus rufipennis, Lafr.	222
Pyrocephalus rubineus (Bodd.)	227

	Sclater, Cat. page
Myiarchus ferox (Gml.)	233
Pachyrhamphus cinereus (Bodd.)	241
Chiroxiphia lanceolata (Wagl.)	251
Bucco bicinctus, Gould	271
Chelidoptera tenebrosa (Pall.)	275
Florisuga flabellifera, Gould	295
Coccyzus pumilus, Strickl.	323
Conurus cyanopterus (Bodd.)	350
Chrysotis festiva (L.)	354
Psittacula cyanoptera (Bodd.) (*passerina*, L.)	357

Mr. E. C. Taylor notices the following species obtained by himself in Trinidad:—

	Taylor, Ibis, 1864. page	Sclater, Cat. page
Tinnunculus sparverius (L.)	80	—
Turdus fumigatus, Licht.	80	4
Campylorhynchus nuchalis, Cab.	80	17
Chlorostilbon atala (Less.)	92	318
Spermophila intermedia, Cab.	83	103
Phyllomyias semifusca, Scl.	86	214
Camptostoma imberbe, Scl.	86	215
Elainea pagana (Licht.)	86	216
Contopus bogotensis, Bp.	87	231
Pachyrhamphus albogriseus, Scl.	87	242
Dryocopus erythrops, Valenc.	93	333
Chamæpelia albivitta, Bp.	94	
Crax alector, L.	95	

Order ACCIPITRES.

Fam. Falconidæ.

Buteoninæ.

1. Hypomorphnus gundlachi, Cab. J. f. Orn. 1854, Extrah. p. lxxx.

Morphnus urubitinga, Lembeye (nec Gmel.), Aves de Cuba, pl. 3. f. 3 (med.).

Astur unicinctus, Léot. (nec Temm.) p. 44.

One specimen in old plumage.

Long. al.	caud.	rostr. (cera excl.)	a rict.	tars.	dig. med.*
15″	7″ 10‴	13‴	19‴	3″ 1‴	1″ 10‴

Dr. Léotaud erroneously inserts this species as *Astur unicinctus*, Temm., a perfectly distinct species.

Our specimen agrees very well with the description given by Dr. Cabanis, but is apparently more advanced in age. The whole plumage is dark brownish black; the feathers on the upper part of the

* The measurements are given in old French inches and lines.

interscapulium are rufous at the base; the upper and under tail-coverts are margined narrowly with white; the tail has a broad white cross band, above this is another much narrower and not quite complete, a third, still narrower and ill-defined, is placed at the base and hidden by the tail-coverts; the tail-feathers are tipped with white; the under surface of the wings shows a white space, formed by the white basal third of the first four primaries, but this white is speckled very minutely with greyish black, as in *H. anthracinus*; the secondaries bear on the middle portion of the inner web six or seven cross bands of pale rufous brown, somewhat ill-defined and mixed and washed with dark brown, giving a somewhat marmorated appearance.

This species is closely allied to *H. anthracinus*, Licht., but may be easily distinguished by the two white bands on the base of the tail, besides the white middle cross band.

2. Leucopternis albicollis (Lath.); Pelz. Geier und Falken (1862).

Asturina albicollis, Schleg. Asturinæ, p. 9.
Buteo pœcilonotus, Léot. p. 7.
Buteo albicollis, Taylor, *l. c.* p. 79.

One specimen in full dress, agreeing with the excellent description given by Dr. Léotaud.

Long. al.	caud.	rostr.	a rict.	tars.	dig. med.	ung.
14″	8″	12‴	18‴	3″ 3‴	2″	9‴

Aquilinæ.

3. Spizaëtus ornatus (Daud.); Schleg. M. P.-B. *Astures*, p. 2 (syn. part.); Léot. p. 10.

Two specimens of this fine species:—one in the well-known plumage of the old bird, as described by Prince Max, Dr. Léotaud, and others; the other in the very different plumage of the younger stage, of which I cannot find any description. I therefore add a detailed account of this specimen.

Head, neck, upper portion of the interscapulium, and all the underparts white, tinged faintly with pale ochre on the sides of the head and neck; the sides of the belly and the under wing-coverts with large cordiform black spots, as in the old bird, the feathers on the femur and tarsus likewise barred transversely with white and black; shoulders, wings, and tail dark brown, and marked with darker bars as in the old bird, but not so distinct; the tail with six broad cross bands of brownish black; the upper quill-coverts margined with white at the point, as in the adult; on the occiput there is a considerably long crest, composed of some black, brownish, and whitish feathers, which are strongly worn off, showing that the bird is not a very young one; on the hind neck some feathers of a rufous brown, as in the old bird, which indicate evidently that these parts are assuming the colouring of the adult.

Long. al.	caud.	rost.	a rict.	tars.	dig. med.	ung.	
$14\frac{1}{2}''$	$9\frac{3}{4}'''$	$14'''$	$19'''$	$3''\ 3'''$	$2''\ 0'''$	$12'''$	(ad.)
$14\frac{3}{4}$	$10\frac{3}{4}$	13	20	3 4	2 2	12	(jun.)

Professor Schlegel is certainly wrong in considering *S. braccatus*, Spix (Des Murs, Icon. pl. 67; *S. tyrannus*, Neuw.) to be "l'oiseau dans la première livrée" of *S. ornatus*.

Falconinæ.

4. Falco columbarius, L.; Schleg. Mus. P.-B. *Falcones*, p. 19.

Hypotriorchis columbarius, Léot. p. 26.

One male in young plumage, resembling in every respect the young of our *F. æsalon*, except that the tail has five rusty cross bands instead of seven as in *F. æsalon*. The latter species seems to be also distinguished by having considerably longer wings.

Long. al.	caud.	rostr.	tars.	dig. med.	
$6''\ 10'''$	$4''\ 0'''$	$5\frac{1}{2}'''$	$14'''$	$13'''$	(♂ jun., Trinidad.)
7 1	4 5	$5\frac{1}{2}$	14	14	(♂ ad., N. America.)
8 0	4 10	6	17	14	(♀ ad., Cuba.)
$7''\ 4'''$–7 9	$4''\ 1'''$–4 6	5–6	15–16	12–13	(*æsalon*, 3 males.)

5. Falco sparverius, L.; Schleg. *Falcones*, p. 30.

Tinnunculus sparverius, Pelz. Geier und Falken (1863), p. 627; Taylor, *l. c.* p. 80.

A young male agreeing entirely with specimens from Texas and California (Cape St. Lucas: *Xantus*).

Dr. Léotaud does not include this widely distributed species; but Mr. Taylor notices—"Occasionally seen in Trinidad, but much less common there than in the Antilles Islands."

6. Harpagus bidentatus (Lath.); Burm. ii. p. 100; Léot. p. 28.

An old one and two in change of plumage, having the underparts white, with longitudinal black shaft-stripes; in one the flanks bear cordiform brown spots.

Accipitrinæ.

7. Asturina nitida (Lath.); Taylor, *l. c.* p. 80.

Astur nitidus, Léot. p. 46.

One specimen in the very different and curious first year's plumage, as described by Dr. Léotaud (p. 47).

Milvinæ.

8. Cymindis cayennensis (Gmel.); Schleg. Mus. P.-B. *Pernes*, p. 9; Léot. p. 34.

A young specimen, brown above, below white, with black shaft-stripes; tail with four black and four brown cross bands.

We possess this species from Brazil and Guatemala.

9. Cymindis uncinatus, Ill.; Schleg. Mus. P.-B. *Pernes*, p. 8; Léot. p. 36.

One specimen in the dress of the younger bird, as described by Dr. Léotaud (p. 38).

Cymindis pucherani, Léot. p. 40.

Very probably this species is identical with *Falco vitticaudatus*, Neuw. (Beitr. p. 178; *Cymindis vitticaudus*, Pelz. i. p. 6), which Professor Schlegel declares to be nothing more than a black variety of *C. uncinatus* (Mus. P.-B. *Pernes*, p. 8). It has certainly nothing whatever to do with *Urubitinga anthracina* or *U. schistacea*, as Dr. Sclater suggests (Ibis, 1867, p. 107), but is a true *Cymindis* (tarsus $13\frac{1}{2}'''$!).

10. Gampsonyx swainsoni, Vig.; Burm. ii. p. 114; Léot. p. 41.

Two specimens of this widely distributed species, agreeing with specimens from Northern Brazil (Ceará).

Fam. Strigidæ.

11. Athene infuscata (Temm.).

Glaucidium passerinoides (Temm.); Burm. ii. p. 143.
Athene phalænoides, Léot. p. 55.
Glaucidium infuscatum et *phalænoides*, Cab. J. f. Orn. 1869, pp. 207, 208.
Glaucidium ferrugineum, Taylor, Ibis, 1864, p. 80.

One specimen, which I am not able to distinguish from Brazilian specimens.

12. Scops brasiliensis, Briss.

Scops decussata, Burm. ii. p. 126.
Ephialtes portoricensis, Léot. p. 57.

One specimen, agreeing with Brazilian specimens.

13. Syrnium torquatum (Daud.).

Athene torquata, Léot. p. 52.

One specimen.

Order PASSERES.

Fam. Caprimulgidæ.

14. Nyctibius jamaicensis, Gmel.; Scl. P. Z. S. 1866, p. 129.

Nyctibius pectoralis (Gould); Léot. p. 70; Taylor, p. 90.

One specimen, tinged more strongly with rufous brown than in a Brazilian specimen before me, but evidently of the same species, which varies a good deal, as mentioned by Dr. Sclater.

Long. al.	caud.	rostr.	rostr. a riet.	dig. med.
$9''$	$6''\ 6'''$	$6\frac{1}{2}'''$	$19'''$	$8'''$

15. Chætura poliura (Temm.); Buff. Pl. Enl. 726. f. 2.

Acanthylis brachyura, Jard.
Chætura poliura, Scl. P. Z. S. 1865, p. 611 (syn. part.).
Acanthylis poliurus, Léot. p. 86.
Chætura brachycerca, Scl. & Salv. P. Z. S. 1867, p. 758, t. 34 (opt.).

One specimen, in every respect agreeing with the description and figure published recently by Dr. Sclater and Mr. Salvin from specimens sent from Eastern Peru, and supposed to belong to a new species. In comparing it with the description of *A. brachyura*, Jard. (Ann. and Mag. N. H. vol. xviii. 1846, p. 120), I was strongly inclined to believe in the identity of both "short-tailed Swifts;" but, unfortunately, Sir William Jardine does not mention the colour of the under tail-coverts. Being, therefore, unable to settle the question by means of positive evidence, I wrote to Dr. Sclater; and he most kindly gave me the following answer:—"You are right in considering *C. brachycerca* to be identical with *C. brachyura*, Jard.; I possess one of the Tobago specimens. But now I find that it is the true *Cypselus poliurus* of Jamaica, founded on Buffon's Pl. Enl. 726. f. 2; so I call the species *Chætura poliura*, while the Brazilian species must be *C. cinereicauda*, Cass." *

C. poliura, as the species must be named, is easily distinguishable from the nearest allied species, *C. cinereicauda*, Cass., in having the upper as well as the under tail-coverts brownish grey; the tail-feathers darker, the shafts black, projecting about 1‴; the upper tail-coverts reach nearly to the end of the tail.

Long. al.	caud.	culm.	rict.	tars.
4″ 7‴	1″ 1‴	1¾‴	4¼‴	5‴

Fam. Coraciadæ.

16. Prionites swainsoni (Scl.).

Prionites bahamensis, Sw.
Momotus bahamensis, Léot. p. 96.
Momotus swainsoni, Scl. Cat. p. 261; Taylor, Ibis, 1864, p. 88.

One old specimen.

Fam. Trogonidæ.

17. Trogon meridionalis, Sw.; Sclat. Cat. p. 276.

Trogon sulphureus, Léot. (nec Spix), p. 101.
Aganus violaceus (Gmel.), Cab. et Heine, Mus. Hein. iv. p. 190.

Male and female, very accurately described by Dr. Léotaud.

Long. al.	caud.	rostr. a fron.	rostr. a rict.	tars.	
4″ 4‴	4″ 2‴	7‴	10½‴	5½‴	(♂)
4 2	4 1	6½	10	5	(♀)

Dr. Cabanis notices the length of wing 4″ 7‴, that of tail 5″ 2‴; but Dr. Léotaud measures the wings also 4″ 3‴.

* *Cf.* Mr. Sclater's remarks on this subject, *antèa* p. 329.—Ed.

18. Trogon viridis, L.; Scl. Cat. p. 275; Léot. p. 98; Taylor, Ibis, 1864, p. 88.

Aganus viridis, Cab. et Heine, Mus. Hein. iv. p. 196.

One specimen, in the plumage of the old male as described by the Prince of Neuwied and Dr. Léotaud, and agreeing in every respect with a specimen from Brazil.

Long. al.	caud.	rostr.	rostr. a rict.	tars.	
5″ 3‴	5″ 1‴	8½‴	11½‴	6½‴	(Trinidad.)
5 7	5 4	8½	12	—	(Brazil.)
5 7	5 9	9	12	7	(♂, Cayenne.)
5 1	5 1	8½	11	—	(♀, Cayenne.)
5 2	5 11	8	11½	6	(♂, jun. Guiana.)

Both have the six middle tail-feathers of a dark metallic green, with scarcely any tinge of bluish; the rump and upper tail-coverts darker metallic green, with bluish reflexions. A young male from Demerara has the tail-feathers black, only the two innermost with green reflections on the outer web; the outer tail-feathers are barred white and black at the apical half, like those of the female.

We possess an old male from Cayenne, which shows a very peculiar difference (as far as I know, not yet mentioned by any describer), viz. in having the tail-feathers, instead of green in every light, with a dark indigo-blue lustre, and the greater part of the uropygium and upper tail-coverts vivid dark purplish blue. If new, *T. cyanurus*, Hartl.; otherwise it agrees in every respect.

19. Trogon collaris, Vieill.; Scl. Cat. p. 276; Léot. p. 103 (descr. opt.); Taylor, *l. c.* p. 88.

Trogon curucui (L.); Cab. et Heine, Mus. Hein. iv. p. 176.

One specimen, not different from a specimen from Surinam in the Bremen collection.

T. curucui, Linné, based upon the description of Marcgrave and Brisson, is most probably this species, but cannot be made out with certainty. The white and black bars on the three outer tail-feathers, as described by Brisson, are very well referable to this species; but he does not mention the white cross band which separates the golden green of the jugulum and the scarlet of the breast.

The figure of *Trogon curucui* by Hahn (Vög. aus As. Afr. Am. &c. Liefer. vii. t. 3) belongs undoubtedly to this species, and not to *T. melanurus*, Sw., as concluded by Dr. Cabanis (Mus. Hein. iv. p. 201).

Long. al.	caud.	rostr.	a rict.	tars.	
4″ 3‴	4″ 10‴	6½‴	9½‴	7‴	(Trinidad.)
4 5	4 8½	6	10	—	(Surinam.)
4 5	4 6	6½	—	—	(ap. Léot.)

A very good description of this species is given by Dr. Léotaud.

I append a remark on *Trogon atricollis*, Vieill. (Enc. Méth. p. 1361; Gal. Ois. i. p. 17, t. 31), with which Dr. Cabanis (Mus. Hein. iv. p. 181) unites *T. chrysochlorus*, Natt. (Pelz. Sitzungsb. der math. naturw. Classe der Kais. Ak. d. Wiss. in Wien, vol. xx. 1856, p. 496), a species distinguished chiefly by its larger size. The Imperial Museum of Vienna possesses fifteen specimens of this large form from Ypanema in Southern Brazil, and nine specimens of the true *T. atricollis* from the north of Brazil (Borba, Marabitanas, Barra do Rio Negro), all collected by the late Johann Natterer. Von Pelzeln, in his valuable publication on Natterer's collections, still insists on the specific separation of the two species; and, as far as I can judge, he is right. We possess one specimen of the true *T. atricollis* from Guiana (Demerara), which is much inferior in size to the measurements noticed of *T. chrysochlorus* by von Pelzeln. I therefore incline to believe that the *T.* (*Pothinus*) *atricollis* described by Cabanis belongs to *T. chrysochlorus*, as well as *T. atricollis* of Neuwied (iv. p. 309) and Burmeister (ii. p. 279). But to settle this question finally further researches are necessary.

Fam. Alcedinidæ.

20. Ceryle americana (Gmel.); Léot. p. 112.

Chloroceryle americana, Scl. Cat. p. 265; Taylor, *l. c.* p. 88.

A female of this widely distributed species, agreeing with specimens from New Granada in the Bremen collection.

21. Ceryle superciliosa (L.); Léot. p. 115.

Chloroceryle superciliosa, Scl. Cat. p. 265; Taylor, *l. c.* p. 88.

One specimen.

Fam. Cœrebidæ.

22. Dacnis atricapilla (Vieill.).

Chlorophanes atricapilla, Scl. Cat. p. 52; Taylor, *l. c.* p. 81.
Dacnis spiza, Léot. p. 122.
Chlorophanes guatemalensis, Scl.

Six males and one female.

In comparing these specimens with others from Brazil, New Granada, and Guatemala (Vera Paz), I must consider them all to belong to one and the same species, having convinced myself that there is no real constancy in the characters by which Mr. Cassin separated four local varieties or races, although there exists a considerable variability in respect of the green of the plumage, as well as in size. Two males from Trinidad are as bright green as our Guatemalan one; and a specimen from South Brazil (St. Catharina), collected by Burmeister, jun., differs very much less, having the bill nearly as large as the stout-billed specimens from Guatemala. Columbian specimens are not distinguishable from Trinidad ones; others from Trinidad are as dark green as others from Brazil.

Long. al.	caud.	rostr.	a rict.	tars.	
2″ 8‴–2″ 10‴	20–22‴	6–7‴	8–9½‴	8‴	(♂ ♂, Trinidad.)
2 7	20	6½	8	8	(♀, Trinidad.)
2 7½	21	6	7½	7½	(♂, Columbia.)
2 5	—	5¼	7	—	(♀, Columbia.)
2 7	18	5½	—	7	(♂, Brazil.)
2 6	21	6¾	8½	8	(♂, Brazil, St. Catharina.)
2 9½	22	7½	9	8	(♂, Guatemala.)
2 8	21	7	8½	8	(♀, Guatemala.)

23. Dacnis cayana (L.); Scl. Cat. p. 50; Léot. p. 124; Taylor, *l. c.* p. 81.

One specimen in the dress of the old male, not different from specimens from Guiana (Demerara) and Brazil.

24. Cœreba longirostris (Cab.).

Arbelorhina longirostris, Cab. M. H. p. 96.
Cœreba cærulea, Léot. p. 120; Taylor, *l. c.* p. 81.

Five males and two females; the latter very well described by Dr. Léotaud.

Long. al.	caud.	rostr.	tars.	
2″ 1‴–2″ 3‴	11–12‴	9–10‴	6½‴	(♂, Trinidad.)
2 1 –2 2	12	9–10½	7	(♀, Trinidad.)
2 2	12½	7½	6	(♂, New Granada, *cærulea*.)
2 2	12½	7½	6	(♂, Brazil, *cærulea*.)

The measurements noticed before seem to prove that the bill in this species is constantly longer, although otherwise there is no difference from the well-known *C. cærulea* from Brazil.

25. Cœreba cyanea (L.); Scl. Cat. p. 52; Léot. p. 118; Taylor, *l. c.* p. 81.

Two males, not different from Brazil ones.

Long. al.	caud.	rostr.	tars.
2″ 5‴–2″ 6‴	15–17‴	6–6½‴	6–6½‴

26. Certhiola luteola, Licht.; Scl. Cat. p. 53; Taylor, *l. c.* p. 81.

Certhiola flaveola, Léot. p. 126.

Three specimens in old plumage.

Long. al.	caud.	rostr.	tars.
2″ 2½‴	15‴	6‴	7½‴

Being engaged in preparing a Monograph of the members of this difficult group, I keep back the many notes which I have already collected till I am able to give a full account, which I hope will be in a very short time.

Fam. Trochilidæ.

27. Phaëtornis mazeppa (Less.).

Glaucis mazeppa, Scl. Cat. p. 285; Taylor, *l. c.* p. 91.
Polytmus hirsutus, Léot. p. 139.
Glaucis hirsuta (part.), Cab. Mus. Hein. iii. p. 4.

Two specimens, differing from Brazilian ones only in having the tail-feathers tipped very narrowly with white; but, as Dr. Cabanis considers, this character is not constant, varying according to age and sex.

28. Lampornis gramineus (Gmel.); Scl. Cat. p. 291; Taylor, *l. c.* p. 91.

Polytmus dominicus, Léot. p. 132.

An old and a young male, corresponding very well with specimens from Guiana.

29. Lampornis mango (L.); Scl. Cat. p. 290; Taylor, *l. c.* p. 91.

Polytmus mango, Léot. p. 131.

Two females.

30. Heliomaster longirostris (Vieill.); Scl. Cat. p. 310; Taylor, *l. c.* p. 92.

Mellisuga longirostris, Léot. p. 147.

One specimen, agreeing with the description of the female by Dr. Léotaud.

The bill measures 1″ 3‴.

31. Chrysolampis moschitus (L.); Scl. Cat. p. 303; Taylor, *l. c.* p. 92.

Mellisuga moschita, Léot. p. 145.

One female and a young male, as described accurately by Dr. Léotaud.

32. Hemithylaca erythronota (Less.).

Saucerottia(?) *erythronota*, Scl. Cat. p. 315.
Polytmus erythronotus, Léot. p. 137.
Erythronota antiqua, Taylor, *l. c.* p. 92.

An old specimen.

Fam. Certhiadæ.

33. Xenops rutilans, Licht.; Scl. Cat. p. 159; Léot. p. 156; Taylor, *l. c.* p. 85.

Xenops heterurus, Cab. M. H. p. 33; Scl. Cat. p. 159.

One specimen, agreeing in respect to the markings of the tail with the description of *X. heterurus*, Cab., except that the fourth feather

is black only at the base of the outer web (not wholly), and that the fifth on the left side only is varied with black, whereas the fifth on the right hand is uniform rufous like the two innermost. In a specimen from Bogotá, received from J. Verreaux (s. n. *littoralis*, Scl.!), the outermost is quite rufous, the second black at the base of the inner web, the third black on the inner web (except a rufous apical spot), the fourth wholly black on the inner web, the fifth black on the outer web. A specimen from Brazil (Canto Gallo) has the two outer feathers wholly rufous, the third and fourth black on the inner web, the fifth rufous with black interrupted shaft-stripe.

It is easy to perceive that these differences in the colouring of the tail-feathers are of no specific value. The colouring of the underparts and the extent of the light shaft-spots is also variable, and will not allow of a specific separation. The Bogotá one has the underparts more greyish olive-brown with narrow whitish streaks, precisely the same as in a Brazilian specimen; the other Brazilian one has much broader shaft-streaks; in the Trinidad bird they are not so broad, but the colour of the underparts is more rufescent olive.

Long. al.	caud.	rostr.	tars.	
2″ 6‴	19‴	c. 5‴	6‴	(Trinidad.)
2 6	21	5½	6	(Bogotá.)
2 6	23	5	6½	(Brazil.)
2 4	21	c. 5	6	(Brazil.)

34. Thryothorus rutilus, Vieill.; Scl. Cat. p. 21; Taylor, *l. c.* p. 81.

Troglodytes rutilus, Lcot. p. 173.

Two specimens, somewhat smaller than a Brazilian specimen in the Bremen Collection.

Long. al.	rectr. med.	rostr.	tars.	
2″ 2‴	20‴	7‴	9‴	
2 3	20½	7	9	
2 5	22	7	10	(Brazil.)

35. Heleodytes minor, Cab. M. H. p. 80; Scl. Cat. p. 16.

One specimen in apparently old plumage.

Upper surface of head dark brown; nape dark brown, with obsolete rufous-brown edgings; back and remainder of the upper parts uniform rufous brown; the upper tail-coverts with some indistinct dark-brown bars; from the nostrils above the eye to the sides of nape a broad white supercilium; lores white, with a narrow dark line; behind the eye a broad dark-brown streak to the nape; sides of head and neck and the whole underparts, including the under wing-coverts, white, tinged on the flanks and under tail-coverts with a pale isabelline colour; remiges dark olive-brown, paler on the margin of the inner web, the primaries on the outer web margined with reddish brown, the secondaries much broader, and with eight to ten obsolete dark bars; the tectrices of the primaries brown, those

of the secondaries rufous brown, with some indistinct dark bars; two middle tail-feathers dark brown with numerous (nineteen) blackish bars, remainder of the tail-feathers brownish black, with a broad (5‴) white cross band before the narrow dark end; bill black horn-colour, pale greyish at the base of the lower mandible; legs dark greyish brown, claws paler.

Long. al.	reetr. med.	rostr.	a rict.	tars.	dig. med.	
3″ 1‴	2″ 10‴	$10\frac{1}{2}$‴	13‴	12‴	8‴	(Trinidad.)
3 2	3 2	—	14	12	—	(ap. Cabanis.)
3″ 5‴–3 9	3″–3 3	—	—	$13\frac{1}{2}$–15	8–$9\frac{1}{2}$	(*griseus*, ap. Pelz.)

Dr. Cabanis has pointed out the characters of this apparently rare species, which is not mentioned in the work of Dr. Léotaud, in a very brief manner; a minute description therefore was necessary. Unfortunately I possess no specimen of *H. griseus*, Sw., which seems to be sufficiently distinct, not only in being considerably larger (as the measurements noticed by Von Pelzeln prove), but also in the coloration. Dr. Sclater notices, besides *H. griseus*, also a *H. minor* from Trinidad; but this latter "being so similar to *H. griseus* in every respect, except in size, I question whether it may not be a variety of age or sex of that species" (P. Z. S. 1856, p. 97). *H. minor*, as thus described, may be very probably only a smaller-sized specimen of the true *H. griseus*.

Fam. Lusciniadæ.

Mniotiltinæ.

36. Sylvicola æstiva (Gmel.).

Dendræca æstiva, Scl. Cat. p. 32; Taylor, *l. c.* p. 81.
Mniotilta petechia, Léot. p. 176.

Six males and two females, not distinguishable from specimens from the United States. One old male shows very narrow reddish-brown stripes on the vertex.

Long. al.	caud.	rostr.	tars.	
2″ 4‴–2″ $5\frac{1}{2}$‴	$18\frac{1}{2}$–20‴	4–$4\frac{1}{4}$‴	8‴	(♂, Trinidad.)
2 3	18	4	8	(♀, Trinidad.)
2 4	$18\frac{1}{2}$	4	8	(♂, N. America.)
2 5	—	c. 5	9	(♂, *aureola*, Galapagos.)
2 $5\frac{1}{2}$	$22\frac{1}{2}$	5	9	(♀, *aureola*, Galapagos.)
2 5	22	5	9	(♀, *aureola*, Galapagos.)

The male has the head above bright yellow. Dr. Léotaud describes the Trinidad bird as having the head above "jaune orangé tirant sur le rouge." Might not this be *S. petechia*, L., which Dr. Sclater (Cat. p. 32) considers to be different from *S. æstiva*? But, as Dr. Léotaud states, *S. æstiva* arrives only as a winter visitor in the island of Trinidad.

Sylvicola aureola, Gould (Voy. Beagle, p. 86, pl. 28), from the

Galapagos, is closely allied to *S. æstiva*, but differs in its larger size. The male has the head above cinnamomeous orange, the chestnut blotches on the underparts are very pale and inconspicuous, and the back shows no traces of reddish brown. The female is quite different from that of *S. æstiva*.

37. Trichas æquinoctialis (Gmel.).

Geothlypis æquinoctialis, Scl. Cat. p. 27; Taylor, *l. c.* p. 81.
Trichas velatus, Léot. p. 183.

Two males and a female, agreeing with the characters pointed out by Dr. Cabanis (Mus. Hein. i. p. 16, note).

Long. al.	caud.	rostr.	tars.
2″ 1‴	1″ 10‴	5–5½‴	9–10‴

Dr. Sclater has rectified already (Ibis, 1867, p. 107) the error of Dr. Léotaud in taking this species for *Trichas velatus*, Vieill.

38. Basileuterus vermivorus (Vieill.); Scl. Cat. p. 34.

Trichas bivittatus, Léot. (nec Lafr.) p. 184.

One specimen, agreeing in every respect with a Brazilian specimen. This is a very widely distributed species.

39. Setophaga ruticilla (L.); Scl. Cat. p. 36; Léot. p. 248; Taylor, *l. c.* p. 81.

Two males and a female, agreeing with specimens from the United States. One old male has the beak black, the other (also a very old one) only horn-brown, still paler than in the female.

Vireoninæ.

40. Hylophilus insularis, Scl. P. Z. S. 1861, p. 128, Cat. p. 45; Léot. p. 186.

One specimen, agreeing very well with the description given by Dr. Sclater from a specimen from Tobago.

41. Vireo olivaceus (L.).

Phyllomanes olivaceus et *P. chivi*, Cab. M. H. p. 63.
Vireosylvia olivacea et *V. agilis*, Scl. Cat. p. 43.
Vireosylvia olivacea, Léot. p. 250.

Long. al.	caud.	rostr.	tars.	
2″ 8‴	1″ 10‴	c. 6‴	8‴	(Trinidad.)
2 10	1 10	5½	7½	(Trinidad.)
3 0	1 11	6	8	(Peru.)
2 7	1 10	5¼	8	(N. America.)
2 7	1 11	5½	7½	(N. America.)
2 8	1 10	5	8	(S. Brazil.)

Two specimens.

A careful comparison of specimens from Trinidad, the United

States, Peru (Chamicuros), and South Brazil (St. Catharina), convinces me that I am right in uniting *Vireo agilis* with *V. olivaceus*; for I am not able to find out a single constant character to distinguish them. Von Pelzeln already remarked (Orn. Bras. ii. p. 73, note 1) the only difference might be that *V. olivaceus* has the first primary equal to the fourth, whilst in *V. agilis* the first is equal to the fifth; but in my experience these differences are not constant and cannot be considered of specific value. In one North-American specimen the first quill is equal to the sixth, in the other to the fifth, as in a Trinidad one; in the other specimen from Trinidad the first quill is shorter than the fifth, in a Brazilian one a little longer, and in a Peruvian specimen of an intermediate length between the fourth and fifth. All the specimens have full-grown quills. With respect to the coloration, there is not difference sufficient to distinguish more than one species. The Trinidad skins agree in every respect with those from North America, as well as with the Brazilian specimen; the latter, collected by Mr. Burmeister, jun., is in general somewhat darker; the Peruvian one is duller above, the under tail-coverts are much paler, showing only a faint tinge of yellow; but, as we learn from Mr. Cassin (B. N. Am. p. 332), this is only an individual difference, for in North-American specimens the under tail-coverts "are sometimes almost entirely white." The size varies much.

As noticed by Professor Reinhardt, this little bird has been procured once in Greenland. Greenland and the southern portion of Brazil inhabited by one and the same species is a striking instance of the very extended distribution of many birds, at which I should feel much astonished if I had not met with numerous examples of the same kind in African ornithology.

Fam. Formicariidæ.

Thamnophilinæ.

42. Cyclorhis flavipectus, Scl. P. Z. S. 1858, p. 448, Cat. p. 45; Lcot. p. 263; Taylor, *l. c.* p. 81.

? *Cyclorhis subflavescens*, Cab. J. f. Orn. 1860, p. 405.

Three specimens.

This species is closely allied to *C. wiedi*, Pelz. (Orn. Bras. iii. p. 137; *T. guianensis*, Neuw.; *C. viridis*, Burm., nec Cab.), from Brazil; but the head above is more decidedly grey, the rufous frontal and superciliary stripe broader and darker, and the legs are not lead-coloured, but light fleshy yellowish, this latter being the chief character.

Two old specimens have the head grey, only at the occiput washed with a dull brown; a third one has the whole upper surface of the head tinged with reddish olive, and the white on the abdomen also washed with a very faint tint of isabelline colour. This one, being in moult, is undoubtedly a young bird, and agrees very well with

the description of *C. subflavescens*, which seems not to be specifically separable.

Of *C. wiedii* I have lately received specimens from Ceará, in Northern Brazil.

Long. al.	caud.	rostr.	tars.	
2″ 8‴	2″ 0‴	$7\frac{1}{2}$‴	10‴	
2 9	1 11	$7\frac{1}{2}$	10	
2 8	2 1	7	10	(*wiedi*, Brazil.)

43. Thamnophilus major, Vieill.; Scl. P. Z. S. 1858, p. 209; *ej.* Cat. p. 172; Taylor, *l. c.* p. 85.

Thamnophilus stagurus, Léot. p. 266.
Thamnophilus borbæ, Pelz. Orn. Bras. ii. p. 140.

An old bird.

This and two specimens from Guiana agree rather with the characters noticed to be differential by Von Pelzelu in *T. borbæ* than with the true *T. major*, Vieill., of Paraguay. But having before me a series of specimens from Brazil and Paraguay, I am not able to distinguish the two species exactly. It is true that specimens from the northern parts (Guiana) have apparently less white bars on the tail, which is shorter, but these characters are variable and not constant.

The Paraguay one has the two outer tail-feathers, except the white apical margin, with five broad white marginal patches, which on the outermost runs on both webs, nearly forming cross bands; the primaries have a well-defined white margin on the outer web; on the upper wing-coverts are two white cross bands, besides a third formed by the white outer margins of the tectrices of the secondaries. The Brazilian bird is alike with respect to the markings of the tail-feathers; but the white margins on the primaries are much less defined, and nearly all the tectrices are tipped with white (as in Spix's figure, t. 32. f. 1). It is the same in an old Guiana specimen (Demerara); but this one wants the white margins on the primaries almost entirely, and the white markings on the tail-feathers are narrower and on the outermost feather do not run on both webs. The Trinidad bird agrees with the latter; but it has the two white cross bands on the tectrices and the white margins on the primaries as strongly marked as the Paraguay one. In a somewhat younger specimen from Guiana the white tips on the tectrices are almost entirely absent, as well as the white margins on the primaries, and the two outer tail-feathers have seven white spots on the inner web. Two specimens from Ceará, in North Brazil, just received, agree with the Paraguay one, but the white on the tail-feathers is more defined and extended, forming on the two outermost regular bars as broad as the black between, the fourth and fifth have six white marginal spots, and the two innermost, instead of being uniform as in the Paraguay and Guiana birds, have five narrow white marginal spots on both webs, besides a white apical spot.

The measurements appended herewith will show that the size is also variable.

Long. al.	caud.	rostr.	tars.	
3″ 6‴	2″ 11‴	$10\frac{1}{2}$‴	$15\frac{1}{2}$‴	(♂, Trinidad.)
3 8	2 10	$11\frac{1}{2}$	15	(♂, Guiana.)
3 5	3 0	$10\frac{1}{2}$	14	(♂, Guiana.)
3 9	3 0	11	15	(♂, Brazil.)
3 7	3 3	10	$15\frac{1}{2}$	(♂, Paraguay.)
3 7	2 10	10	15	(♂, Brazil, Ceará.)
3 5	3 0	10	14	(♂, Brazil, Ceará.)
3 3	2 11	10	15	(♀, Brazil, Ceará.)

44. Thamnophilus doliatus (L.); Scl. Mon. P. Z. S. 1858, p. 217, Cat. p. 175; Léot. p. 264; Taylor, *l. c.* p. 85.

Male and female; somewhat smaller than Guiana specimens, but otherwise not different. Dr. Sclater measures the wing 3 inches (English).

Long. al.	caud.	rostr.	tars.	
2″ 8‴	1″ 11‴	$7\frac{1}{2}$‴	$11\frac{1}{2}$‴	(♂, Trinidad.)
2 6	1 10	—	11	(♀, Trinidad.)
2 9	2 3	8	$11\frac{1}{2}$	(♂, Guiana.)

45. Thamnophilus atricapillus (Gmel.); Scl. Mon. P. Z. S. 1858, p. 215; Cat. p. 174; Taylor, *l. c.* p. 85.

One specimen, similar to Guiana and Brazilian specimens, but the back distinct rufous brown without darker dots along the shafts. In this respect it resembles more *T. leucauchen*, Scl. (P. Z. S. 1855, pl. lxxix.), which seems to be closely allied.

This species has been overlooked by Dr. Léotaud, but is noticed from Trinidad by Mr. Taylor.

Formicariinæ.

46. Formicarius hoffmanni (Cab.).

Myrmornis hoffmanni, Cab. Journ. f. Orn. 1861, p. 95.
Formicarius crissalis, Scl. Cat. p. 191.
Formicarius hoffmanni, Léot. p. 187.
?*Formicivora intermedia*, Taylor, *l. c.* p. 85.
?*Myrmoronis crissalis*, Cab. J. f. Orn. 1861, p. 96.
Formicarius hoffmanni et *F. crissalis*, Salvin, P. Z. S. 1866, p. 75.

Two specimens, which prove that *M. crissalis* is scarcely specifically different from *M. hoffmanni*. One specimen has the under tail-coverts dark chestnut, the other mixed with bright rufous feathers. Dr. Léotaud gives an excellent description of this species.

Long. al.	caud.	rostr.	tars.	dig. med.
3″ 7‴	1″ 10‴	$8\frac{1}{2}$‴	14‴	9‴
3 6	1 9	9	15	$8\frac{1}{2}$

It must be remarked that the allied *F. analis*, D'Orb., is by no

means confined to Bolivia. Natterer obtained specimens at Borba on the Rio Madeira; and Mr. Salvin got specimens from Costa Rica and Panama.

Fluvicolinæ.

47. Fluvicola pica (Bodd.); Scl. Cat. p. 200; Léot. p. 205; Taylor, *l. c.* p. 85.

One specimen, not different from Brazilian ones.

Fam. Tyrannidæ.

48. Myiozetetes inornatus, Lawr.; Ann. Lyc. New York, ix. (1869) p. 268.

One specimen, apparently an old bird, agreeing with the description of Mr. Lawrence.

This seems to be a very good species, characterized by having the whole upper part of head dark brownish black, without a bright vertical spot; a broad white band covers the forehead and runs above the eye and temples round the occiput; the feathers on the occiput are somewhat lengthened, more than usually in this genus.

Long. al.	rectr. med.	rostr.	lat. rostr.	tars.	dig. med.
3″ 7‴	3″	$5\frac{1}{2}$‴	$3\frac{3}{4}$‴	10‴	$5\frac{1}{2}$‴

This species is not mentioned by Dr. Léotaud. Mr. Lawrence describes the bird from Valencia in Venezuela.

There seems to be still some confusion existing about the members of this difficult group. The short diagnoses given by Dr. Cabanis in the 'Museum Heineanum' are by no means sufficient to distinguish the species. The following notes, therefore, will be of some interest, giving revisional notices of some species.

Myiozetetes similis, Spix (*Elainea miles*, Burm., nec Neuw.; *M. similis*, Scl. Cat. p. 219). The Bremen Collection possesses two specimens from Brazil, agreeing very well with the description and figure given by Spix. The back is dirty olive-green, the vertex bright red; the remiges and rectrices are edged externally with dull olive-green; the remiges are bordered broadly on the basal portion of the inner web with pale yellowish. *Elainea cayennensis*, described in the 'Fauna Peruana' (p. 158), is apparently this species.

Myiozetetes texensis, Giraud. Like the preceding, but the back darker and more decidedly green, the coronal patch darker red, and the dimensions rather large. I do not believe that *M. columbianus*, Cab., is really separable (*vide* Journ. f. Orn. 1861, p. 245). This species is widely distributed from Mexico and Central America to Bogotá, Ecuador, and Venezuela. For its occurrence in Texas further evidence seems to be necessary; Mr. Baird has not included this species in his 'Birds of the United States.'

Myiozetetes cayennensis, L. (Scl. p. 219). This species, although nearly allied to the two foregoing, is very well characterized by having the remiges on the inner web very broadly margined with rufous; the quills and tail-feathers are also externally margined with rufous.

Brisson (Orn. ii. p. 404) in his excellent description mentions this peculiarity. Dr. Cabanis (Mus. Hein. p. 61) characterizes *M. cayennensis* as "pileo pulchre flavo;" but a specimen in our collection from Brazil has the vertical patch fiery-red as in *M. similis*, another one, from New Granada (Baranquilla), somewhat less bright, and a third specimen, from Guiana (Demerara), shows only a yellow patch, this latter being apparently a younger bird. Two specimens from Ceará, in North Brazil, agree; in one the coronal patch is dark red as in *M. texensis*, in the other much less vivid; both are males. I believe that *M. guianensis*, Cab., is not specifically different from *M. cayennensis*.

M. icterophrys, Heine (Journ. f. Orn. 1861, p. 197), notwithstanding Dr. Cabanis's suggestion that it is nothing else than *M. columbianus* in fresh-moulted plumage, I take to be a good species, distinguished by the yellowish tinge on the superciliary stripe and on the chin and throat; otherwise it resembles *M. texensis*, having also a bright fiery-red patch on the head, and yellowish margins on the inner web of the wings; but it is considerably smaller. We possess on old one from Baranquilla, and a young one from Bogotá; the latter, being in moult, has no vertical spot, and the yellow on the belly is brighter yellow. *M. granadensis*, Lawr. (Ibis, 1862, p. 11), is identical with this species.

I must, however, remark that *Muscicapa trivirgata*, Neuw., can scarcely be the female of *M. similis*, because the Prince, a very accurate describer, as is well known, says "chin and throat yellow," and his measurements are much smaller.

Long. al.		caud.		rostr.	latit. ad bas.	tars.	dig. med.	
3″	7‴	2″	8‴	$5\frac{3}{4}$‴	$3\frac{1}{4}$‴	8‴	$5\frac{1}{2}$‴	(♂, *similis*, Brazil.)
3	5	2	7	$5\frac{1}{4}$	3	$8\frac{1}{2}$	$5\frac{1}{2}$	(♀, *similis*, Brazil.)
3	9	2	11	$5\frac{1}{2}$	3	$8\frac{1}{2}$	6	(♂, *texensis*, Mexico.)
3	4	2	7	5	$3\frac{1}{4}$	$8\frac{1}{2}$	$5\frac{1}{2}$	(♂, *cayennensis*, Brazil.)
3	3	2	6	5	$2\frac{1}{2}$	8	5	(♂, *cayennensis*, Bogotá.)
3	3	2	6	5	$3\frac{1}{2}$	8	—	(♂, *cayennensis*, Brazil, Ceará.)
3	0	2	3	$5\frac{1}{4}$	3	8	5	(♂, *cayennensis*, Demerara.)
3	2	2	4	$5\frac{1}{2}$	3	8	5	(♂, *icterophrys*, Bogotá.)
2	10	2	1	$5\frac{1}{2}$	$3\frac{1}{2}$	$7\frac{1}{2}$	5	(♂, *icterophrys*, New Granada.)

49. Saurophagus sulphuratus (L.).

Pitangus sulphuratus, Scl. Cat. p. 222.
Saurophagus sulphuratus, Léot. *l. c.* p. 210.

Two specimens.

There is a great variation in the extent of the cinnamon-red colour on the inner web of the quills and tail. In one specimen the rufous colour borders only the inner web, is broad on the quills, narrow on the tail-feathers; in the other one the rufous colour is much brighter and much more extended, nearly as much as in *S. rufipennis*, Lafr., a species which Dr. Sclater also notices from Tri-

nidad (Cat. p. 222). But in our Venezuelan specimens of *S. rufipennis* the whole of the inner web of the secondaries is rufous, whereas in this Trinidad one the secondaries are still brown on the apical third of the feather. The rufous on the inner web of the tail-feathers is also more extended in *S. rufipennis*.

The nearly allied *S. maximiliani*, Cab. (*pitangua*, Neuw.), from Brazil agrees in size and colours, except in having a broad white frontal band; whereas in *S. sulphuratus* there exists only a narrow frontal line, the feathers of which are white with brownish shafts, the forehead therefore becoming washed strongly with white.

S. maximiliani I got in a collection of birds from Ceará, in North Brazil, collected by Mr. Amandus Zietz of Hamburg.

The southern *S. bellicosus* is easily distinguished by the much larger size. *S. sulphuratus* of Burmeister (ii. p. 461) belongs to this latter species, and not to *S. maximiliani*.

Long. al.		caud.		rostr.	lat. rostr.	tars.	dig. med.	
4″	2‴	3″	1‴	$9\frac{3}{4}$‴	5‴	11‴	8‴	(*sulphuratus*, Trinidad.)
4	$4\frac{1}{2}$	3	3	11	5	$10\frac{1}{2}$	—	(*sulphuratus*, Trinidad.)
4	0	3	0	10	$4\frac{1}{2}$	$10\frac{1}{2}$	$7\frac{1}{2}$	(*sulphuratus*, Guiana.)
4	3	3	0	10	$4\frac{1}{4}$	11	7	(*maximiliani*, Brazil.)
4	4	2	11	11	5	11	7	(*maximiliani*, Brazil.)
5	1	3	7	12	5	14	8	(*bellicosus*, Paraguay.)

50. Megarhynchus pitanguus (L.); Cab. M. H. ii. p. 64.

Megarhynchus pitanguus, mexicanus et *chrysogaster*, Scl. Cat. p. 224.

Megarhynchus chrysogaster, Léot. p. 208.

Megarhynchus pitangua, Taylor, *l. c.* p. 86.

Megarhynchus chrysocephalus, Cab. M. H. p. 65.

Two specimens, agreeing in size and colours with others from Costa Rica, Guiana, and Brazil.

"The climatic variety or species" from Ecuador, which Dr. Sclater separated as *M. chrysogaster* (P. Z. S. 1860, p. 281), does not merit a specific denomination. Our Guiana specimen shows the underparts darker yellow than that from Trinidad and Brazil. *M. mexicanus*, Lafr., said to be larger, is also by no means a distinguishable species. Our Brazilian one is as large as that from Costa Rica. Dr. Sclater himself mentions that Panama specimens (P. Z. S. 1864, p. 360) are "intermediate between *M. mexicanus* and *M. chrysogaster* of Ecuador, showing that these two forms pass into one another."

Megarhynchus chrysocephalus (Tsch.), Heine (Journ. f. Orn. 1859, p. 345; Mus. Hein. ii. p. 65), from Venezuela, is, as Dr. Sclater already noticed, most probably this species, the true *M. chrysocephalus* of Tschudi being totally different.

Whether *M. ruficeps*, Sw., indeed belongs to *M. pitanguus*, as usually adopted, seems to be still somewhat dubious. We possess a specimen having a large bright cinnamon-red patch on the vertex, without any inclination to yellow or orange.

Long. al.	caud.	rostr.	lat. ad bas.	tars.	dig. med.	
4″ 3‴	2″ 11‴	13‴	7‴	9½‴	7‴	(Trinidad.)
4 0	2 9	13	6½	9	—	(Trinidad.)
4 3	3 0	12½	7	9	6½	(Demerara.)
4 5½	3 2	13	7	9	7	(Costa Rica.)
4 5	3 1	11½	7	9	—	(Brazil.)
4 2	3 0	14	7	9	6½	(Brazil.)
4 6	3 2	14	7½	9	—	(Brazil, Ceará.)

51. Tyrannus melancholicus, Vieill.

Laphyctes melancholicus et *L. satrapa*, Cab. M. H. ii. pp. 76, 77.
Tyrannus melancholicus et *T. satrapa*, Scl. Cat. p. 235.
Tyrannus melancholicus, Taylor, *l. c.* p. 87.
Tyrannus verticalis, Léot. (nec Say) p. 213.

A younger specimen, without red patch on the crown; the first primaries not attenuated at the apex.

There is no difference whatever between specimens from Venezuela (Angostura) and the Argentine republic (Mendoza); the separation into two representative species for the north and south has therefore no real value. In contradiction to the views of Dr. Cabanis, I agree with Von Pelzeln in considering *T. albigularis*, Burm. (Bras. ii. p. 465), to be specifically different from *T. melancholicus*. A specimen from Brazil in the Bremen Museum shows the chin and throat decidedly white; whereas these parts in *T. melancholicus* are whitish grey. Four specimens from Northern Brazil (Ceará) all show this latter character.

Long. al.	rectr. ext.	rect. med.	rostr.	lat. rostr. ad bas.	tars.	
4″ 1‴	3″ 5‴	2″ 9‴	8½‴	5‴	8‴	(*melancholicus*, Trinidad.)
4 3	3 5	2 9	9	5	8	(*melancholicus*, Venezuela.)
4 5	3 5	2 9	9	5	8	(*melancholicus*, Mendoza.)
4 3	3 4	3 0	9	5½	—	(♂, *albigularis*, Brazil, Ceará.)
3 9	3 2	—	9½	5	—	(♀, *albigularis*, Brazil, Ceará.)
4 2	3 5	2 11	8½	4½	8	(*albigularis*, Brazil.)

52. Milvulus tyrannus (L.); Léot. p. 217.

Milvulus tyrannus et *violentus*, Scl. Cat. p. 237.

One specimen not quite in full plumage, and the yellow feathers on the crown just developing.

The northern and southern forms of this species do not merit a specific separation; at least I cannot find any character which proves to be constant. According to Dr. Cabanis, the Brazilian *M. violentus* may be distinguished in having a darker-coloured back; but in one specimen from Rio Grande do Sul, on the contrary, I find the back lighter, whereas in another specimen from the same locality the back is as dark as in a specimen from Trinidad, which agrees in every respect with two others from Bolivia. A younger specimen from Demerara has the upper parts washed with brown.

Milvulus monachus, Hartl., is based upon a young specimen, as described by Von Pelzeln (Orn. Bras. ii. p. 118, Anmerk. 2). This

last-named ornithologist, having before him twenty-four specimens from Natterer's collection, agrees with me in accepting only one species.

The occurrence of this bird in the United States (New Jersey), as stated by Audubon, has not yet been confirmed.

The size is variable in a high degree.

Long. al.	rectr. ext.	rostr.	tars.	dig. med.	
4″ 1‴	—	$6\frac{1}{2}$‴	8‴	6‴	(jun. Trinidad.)
3 10	5″ 3‴	6	7	5	(jun. Guiana.)
3 6	4 2	5	$7\frac{1}{2}$	5	(jun. Guatemala, type of *M. monachus*.)
4 3	8 5	6	8	5	(♂ ad., Rio Grande do Sul.)
3 11	8 0	6	8	5	(♂ ad., Rio Grande do Sul.)
4″ 1‴–4 3	9″–9 3	$6\frac{1}{2}$	8	$5–5\frac{1}{2}$	(♂ ad., Bolivia.)

Fam. Cotingidæ.

Tityrinæ.

53. Pachyrhamphus niger, Spix; Scl. Cat. p. 241; Taylor, *l. c.* p. 87.

Tityra nigra, Léot. p. 241.

Two males in adult plumage, and one female.

One male black below, only the under tail-coverts being speckled with grey; the other has the whole underparts speckled very minutely with grey on a fuliginous ground. The female agrees very well with the excellent description given by Dr. Léotaud, but shows a singular peculiarity in having the six tail-feathers on the left side with white apical spots, those on the right side with much broader ochreous ones.

The female described by Dr. Sclater (P. Z. S. 1857, p. 76), "rufa, subtus valde dilutior, ochracescens," does not belong to this species.

Piprinæ.

54. Pipra auricapilla, Briss.; Scl. Cat. p. 249; Taylor, *l. c.* p. 87.

Pipra erythrocephala (L.); Léot. p. 255.

Twelve old specimens, not different from Cayenne and Demerara specimens.

Long. al.	caud.	rostr.	tars.
2″ 1‴–2″ $2\frac{1}{2}$‴	$8\frac{1}{2}–9$‴	$3\frac{1}{4}–3\frac{1}{2}$‴	$6\frac{1}{2}$‴

55. Chiromachæris manacus (L.); Scl. Cat. p. 252; Taylor, *l. c.* p. 87.

Pipra gutturalis, Léot. p. 252.

Two males and a female. There is no difference in specimens from Guiana and Brazil.

Von Pelzeln (Orn. Bras. ii. p. 130) has pointed out very accurately the distinguishing characters between this species and the nearly

allied *C. gutturosa*, Desm. The latter we possess from Brazil and New Granada.

The females of the two species are closely allied; but the female of *C. manacus* may be distinguished by being paler olive-green beneath, the underpart of the breast and vent especially are pale yellowish white.

56. CHIROXIPHIA LANCEOLATA (Wagl.); Scl. Cat. p. 251.

Chiroxiphia melanocephala (Vieill.?); Bp. Consp. i. p. 172.

Pipra pareola, Hahn, Vög. aus Asien, Afr. &c. Liefer. xvi. f. 4 (opt.).

An old male and a young male. The latter is dull olive-green; wings and tail dull olive-brown, with greenish edgings externally; the head capped bright scarlet as in the old male; the two middle tail-feathers already prolonged and lanceolated as in the old male, but green.

Specimens from New Granada (Baranquilla) are in every respect like.

"Le Manakin à longue queue de l'île de la Trinité" (*Pipra melanocephala*, Vieillot, Enc. M. p. 389) has nothing whatever to do with this species, and remains doubtful. Dr. Léotaud has omitted this species.

COTINGINÆ.

57. CHASMORHYNCHUS VARIEGATUS (Gmel.); Scl. Cat. p. 257.

Procnias variegatus, Léot. p. 259.

One specimen in change of plumage; upper and under parts like the female (green); rump and upper tail-coverts white; surface of head brown like the male; some of the remiges already deep black.

Long. al.	caud.	rostr.	rict.	lat. ad bas.	tars.	
5″ 10‴	3″ 3‴	8‴	16‴	6½‴	12½‴	
6 0	3 1	8	14	6	13	(♂ ad., Venezuela.)

58. CHASMORHYNCHUS NIVEUS (Bodd.); Scl. Cat. p. 258, Ibis, 1867, p. 108; Taylor, *l. c.* p. 88.

Procnias nivea, Léot. p. 261.

One young bird in obscure green plumage, without a frontal horn, agreeing with a specimen from Guiana (Demerara) in the Bremen Museum.

Long. al.	caud.	rostr.	rict.	lat. ad bas.	tars.	
5″ 1‴	2″ 11‴	8‴	13‴	5‴	12‴	(Trinidad.)
5 5	3 0	7½	14	5½	12	(Guiana.)

The occurrence of this species in the Island of Trinidad, as stated by Dr. Léotaud, has been doubted by Dr. Sclater, who believed that Dr. Léotaud might have been wrong in his determination. As the specimen belonging to this collection proves, there cannot remain any doubt that Dr. Léotaud was right in identifying the species.

Fam. Icteridæ.

Agelainæ.

59. Sturnella hippocrepis, Wagl.

Sturnella hippocrepis, mexicana et *meridionalis*, Scl. Ibis, 1861, p. 179; Cat. Am. B. pp. 139, 841, 842, 843.

Sturnella hippocrepis, Gundl. J. f. Orn. 1856, p. 14.

Long. al.	caud.	rostr.	tars.	dig. med.	
3″ 9½‴	2″ 4‴	13½‴	17‴	11‴	(*hippocrepis*, Trinidad.)
3 11	2 6	14	18	11½	(*hippocrepis*, Venezuela.)
4 9	2 6	12½	17	10½	(♂, *magna*, California.)
4 3	2 3	13	16	10	(♂, *magna*, California.)
4 7	3 0	14	18	12½	(N. America.)

One specimen, similar in every respect to one from Venezuela (Angostura) in the Bremen Collection. Not included in Dr. Léotand's work.

Whether *S. hippocrepis* is really a species or not I am unable to answer with full certainty. The above-mentioned specimen differs from North-American ones in having the sides, the under and upper tail-coverts, as well as the ground-colour of the back more decidedly chestnut reddish; the neck-gorget is narrower, and the wings are shorter. But these differences seem to be only in consequence of age, and referable to the bird being younger. The primaries in both specimens are just developing, and thus the wing is shorter.

The separation of the *Sturnellæ* into five localized species, as Dr. Sclater endeavoured to set forth (Ibis, 1861, p. 179), in which he was followed by Mr. Cassin (Proc. Ac. Phil. 1866, pp. 23, 24), seems to be inadmissible; nobody can distinguish the so-called species from the short diagnoses given as above cited. Mr. Baird has pointed out very minutely the distinctive characters between the eastern and western *S. magna* and *neglecta* (B. N. Am. p. 536); but having before me both forms, I am unable to find any constancy of the characters said to be of specific value. A chief character for *S. neglecta*, having the yellow of chin and throat extending on the side of the lower jaw (not confined strictly within the rami of the lower jaw as in *S. magna*), is not constant. One specimen from California shows this peculiarity; another from the same locality does not do so.

Dr. Cabanis (J. f. Orn. 1856, p. 14, et 1861, p. 10), after having examined specimens from North America, Cuba, Costa Rica, Venezuela, and Guiana, comes to the conclusion that there is only one species; and I believe this opinion is quite right.

60. Pseudoleistes melanicterus, Vieill.

Gymnomystax melanicterus, Scl. Cat. p. 137.

Leistes melanicterus, Cass. Proc. Ac. Phil. 1866, p. 14.

One specimen in the old plumage, agreeing with Brazilian specimens.

This species seems not to have been before recorded from Trinidad.

61. Leistes guianensis (L.); Scl. Cat. p. 138; Taylor, *l. c.* p. 84.

Leistes americanus, Léot. p. 279.

Two specimens, not different from others from Guiana.

62. Leistes icterocephalus (L.).

Chrysomus icterocephalus, Léot. p. 281.
Xanthosomus icterocephalus, Scl. Cat. p. 136; Taylor, *l. c.* p. 84.
Leistes icterocephalus, Cass. Proc. Phil. 1866, p. 14.

An old bird, similar to specimens from New Granada.

63. Molothrus atronitens, Cab. in Schomb. Guian. iii. p. 682.

Molothrus bonariensis, Léot. (nec Gmel.) p. 277.
Molothrus sericeus (part.), Scl. Cat. p. 135.
Molothrus atronitens, Pelz. Orn. Bras. iii. p. 200.

Two specimens.

Old; black, the entire upper and under parts of head and body having a dark purplish-violet lustre, except the middle of the vent and under tail-coverts, which show a dark metallic-green lustre, like the wings and tail and the coverts of the primaries and secondaries; bill and feet black.

A specimen in the Bremen Collection from Brazil agrees in every respect.

Long. al.		(rect. med.) caud.		rostr.	altit. ad bas.	tars.	
3″	9‴	2″	7‴	$7\frac{1}{2}$‴	$3\frac{3}{4}$‴	11‴	(ad., *atronitens*, Cab., Trinidad.)
3	8	2	$6\frac{1}{2}$	8	4	$10\frac{1}{2}$	(ad., *atronitens*, Cab., Trinidad.)
3	7	2	6	7	$3\frac{1}{4}$	$10\frac{1}{2}$	(ad., *atronitens*, Cab., Brazil.)
3	9	2	8	—	—	11	(ap. Cabanis.)
4	3	2	11	$7\frac{1}{2}$	4	$12\frac{1}{2}$	(*bonariensis*, Gmel., Brazil.)
4	11	3	10	$8\frac{1}{2}$	$4\frac{1}{2}$	13	(♂, *cassini*, New Granada.)
4	10	3	8	$8\frac{1}{2}$	$4\frac{1}{4}$	13	(♂, *cassini*, New Granada.)
4	6	3	2	$8\frac{1}{2}$	$4\frac{1}{2}$	13	(♂, *cassini*, New Granada.)
4	4	3	1	$8\frac{1}{2}$	$4\frac{1}{2}$	13	(♂, *æneus*, Wagl., New Granada.)

The description given by Dr. Cabanis, "like *bonariensis*, but much smaller," and the measurements given by him, are undoubtedly referable to this species. The purple-violet lustre on the head and body is quite the same as in *M. bonariensis*; but this latter species does not show the metallic-green shade on the wings and tail so bright, and wants the green lustre on the vent and under tail-coverts. It may possibly be that Vieillot's *Passerina discolor* is this species; but the description not being accompanied by measurements, it is impossible to refer it with certainty to any of the known species of this extremely difficult group. Mr. Cassin, therefore, is certainly wrong in characterizing *M. discolor* (=*atronitens*) as "rather larger than *M. bonariensis* (al. $4\frac{1}{4}$–$4\frac{1}{2}$″)," the true *M. atronitens* being, on the contrary, much smaller. The bird which Mr. Cassin (Proc. Ac. Phil. 1866, p. 20) describes as *M. discolor*, from Trinidad and Cuba, we possess in the Bremen collection from New

Granada (Baranquilla), s. n. *M. robustus*, Cab. The colouring is exactly the same as in *M. atronitens*, also the metallic-green lustre on the vent and under tail-coverts; but the size is constantly much larger. Having proved that *M. discolor* of Cassin cannot be either *M. discolor* of Vieillot or *M. atronitens* of Cabanis (a fact which has been already mentioned by Von Pelzeln, Orn. Bras. iii. p. 200, note 3), I am justified in giving it a new name—*Molothrus cassini*, Finsch. The *Molothrus* sp.?, described by Dr. Sclater (Cat. pp. 135, 821, note), from Trinidad, belongs apparently to this species. I must mention that Dr. Gundlach does not notice this bird in his lists of the birds from Cuba. *M. æneus*, Wagl. (= *robustus*, Cab., Cass. Proc. Phil. 1866, p. 18), from Mexico and Central America, we possess also from New Granada. This species is easily distinguished from *M. cassini*, with which it nearly agrees in size; but those parts which are dark purple-violet in *M. cassini*, in *M. æneus* are black with a silky metallic bronze-like lustre, as described by Wagler and Cassin. *M. purpurascens*, Cassin (*l. c.* p. 20), from Peru, seems to be nearly allied; also his *M. sericeus* (*l. c.* p. 21) from Brazil, which is by no means the species described under this name by Lichtenstein and Swainson. *Xanthornus purpurascens*, Hahn (Vög. aus Asien, Africa, &c. Liefer. v. t. 4), is very probably not the species described under this appellation by Cassin, but must be referred to *M. bonariensis*, Gmel. (Cass. *l. c.* p. 19), with which *Icterus sericeus*, Licht. (Doubl. Cat. p. 19), and *Icterus violaceus*, Neuwied (Beitr. iii. p. 1212), are identical, and, as I am strongly of opinion, also the *Passerina discolor* of Vieillot.

Chalcophaninæ.

64. Chalcophanes lugubris (Sw.).

Quiscalus lugubris, Sw. An. in Menag. p. 299, f. 54 (nec 50) c; Scl. Cat. p. 141; Taylor, *l. c.* p. 84.

Chalcophanes jamaicensis et *minor*, Cab. Schomb. Reise, iii. p. 683.

Chalcophanes lugubris et *minor*, Cab. M. Hein. p. 197.

Quiscalus barita, Léot. p. 268.

Quiscalus lugubris, Cass. Proc. 1866, p. 408.

Old male; black, with a faint purple-violet lustre, much less decided than in *Molothrus bonariensis*; quills and tail with a slight green lustre; the under tail-coverts washed with metallic green; bill and feet black. Another specimen is more uniform glossy black, the purple-violet lustre being scarcely visible. A younger one (or female) shows no purple or greenish reflection; the underside is lighter, more dull brownish black; chin paler brown.

Specimens from Demerara in the Bremen Museum are like.

Long. al.	rectr. med.	rectr. ext.	rostr.	tars.	
4″ 5‴	3″ 9‴	2″ 10‴	11‴	13‴	(♂ ad., Trinidad.)
4 3	3 4	2 10	11	13	(♂ ad., Trinidad.)
3 11	3 2	2 5	10	12	(♂ jun., Trinidad.)
4 3	3 7	2 10	11	14	(♂ ad., Guiana.)
3 9	2 11	2 5	—	12½	(♂ jun., Guiana.)

Icterinæ.

65. Ostinops cristatus (Gmel.).

Ostinops cristatus, Scl. Cat. p. 127; Taylor, *l. c.* p. 83.
Cacicus cristatus, Léot. p. 271.

One specimen.

66. Cassicus icteronotus, Vieill.

Cassicus persicus (L.); Scl. Cat. p. 128; Taylor, *l. c.* p. 84.
Icterus persicus, Léot. p. 273.

Males and females, very much varying in size. Not different from specimens from Guiana.

Long. al.	rect. med.	rostr.	tars.	
6″ 0‴	3″ 10‴	15½‴	15‴	(♂, Trinidad.)
5 8	3 7	16	15	(♂, Trinidad.)
4 2	2 5	13	13	(♀, Trinidad.)
4 10	2 10	14	—	(♀, Trinidad.)
4 10	3 4	14½	13	(♀, Guiana.)

67. Icterus vulgaris, Daud.; Scl. Cat. p. 133.

Two specimens (old males), agreeing with specimens from Cayenne. One specimen has a white mark on the inner web of the exterior tail-feathers, but only on those of the right side.

Not included by Léotaud.

Long. al.	caud.	rostr.	tars.	
4″ 4‴	4″ 0‴	14‴	14‴	(Trinidad.)
4 6	3 11	13	15	(Trinidad.)
4 5	3 11	12½	14	(Cayenne.)

68. Icterus xanthornus (L.); Scl. Cat. p. 133; Léot. p. 275; Taylor, *l. c.* p. 84.

Two males, similar to specimens from Venezuela and Mexico.

Fam. Tanagridæ.

69. Euphona trinitatis, Scl. P. Z. S. 1856, p. 274; Cat. Am. B. p. 57.

Euphone chlorotica, Léot. p. 308.

Three males and two females.

This species differs from the near-allied *E. chlorotica* chiefly in having a narrow black frontal margin, as pointed out by Dr. Sclater. Three males show on the two outer tail-feathers a large white median patch; in another from Trinidad (Bremen collection) this white patch is much smaller.

The female is exactly described by Dr. Léotaud. It is above bright olive-green, tinged strongly with yellow; forehead, an indistinct superciliary stripe, and the upper tail-coverts are more decided yellow; chin, throat, and sides of the body yellow, brightest on the under tail-coverts; remainder of the under parts (throat, breast, and

belly) light pearl-grey, inclining to whitish on the belly; quills and tail brownish black, margined externally with olive yellowish green; under wing-coverts white.

Long. al.	caud.	rostr.	tars.	
2″ 1‴	13½‴	3⅛‴	6½‴	(♂, Trinidad.)
2 1	15½	3⅛	6	(♂, Trinidad.)
1 10½	12½	3	6	(♀, Trinidad.)
2 1	14	3	6	(♂, *chlorotica*.)

70. Euphona violacea (L.); Scl. Mon. P. Z. S. 1856, p. 277, Cat. p. 58; Taylor, *l. c.* p. 82; Léot. p. 306.

Phonasca lichtensteinii, Cab. J. f. Orn. 1860, p. 331, 1865, p. 410.
Euphone lichtensteinii, Pelz. Orn. Bras. iii. p. 204.

Eighteen specimens, all males in full dress. The yellow on the forehead extends to the fore part of the eye; in one specimen it reaches a little further up. The extension of the white on the inner web of the two external tail-feathers varies somewhat; in most of the specimens the inner web is white, with a dark base, and a narrower or broader apical margin; only three specimens of the eighteen show on the inner web of the third tail-feather a white spot.

Long. al.	caud.	rostr.	tars.	
2″ 1‴–2″ 3½‴	12–14‴	c. 3½–4‴	6½–7‴	(ad., Trinidad.)
2 2	14½	3½	7	(ad., Guiana.)
2 3	14½	3¾	7	(ad., Brazil.)

There is no difference in specimens from Brazil and Demerara. *E. lichtensteinii*, said to be smaller, I am not able to distinguish from *E. violacea*, and consider the two, without hesitation, to be identical.

71. Euphona nigricollis, Vieill.; Scl. Mon. P. Z. S. 1856, p. 272; Taylor, *l. c.* p. 81.

Euphona aureata, Léot. p. 310.

One specimen, an old male, not different from Brazilian specimens.

72. Calliste guttata (Cab.); Scl. *l. c.* p. 64; Léot. *l. c.* p. 305; Taylor, *l. c.* p. 82.

One specimen, not distinguishable from others from Ecuador (Quito) in the Bremen Museum.

73. Calliste vieilloti, Scl. *l. c.* p. 69; Taylor, *l. c.* p. 82; Léot. *l. c.* p. 303.

Three specimens.
Distinguished from *C. flaviventris*, Vieill., by the decided yellow coloration of the under parts; but apparently a well-marked species.

74. Calliste desmaresti, Gray; Scl. *l. c.* p. 68; Léot. *l. c.* p. 302; Taylor, *l. c.* p. 82.

Similar to specimens from Venezuela (Caraccas).

75. Thraupis cana (Sw.).

Tanagra cana, Scl. Mon. p. 232, Cat. Am. B. p. 75; Taylor, *l. c.* p. 82.

Tanagra glauca, Léot. (nec Sparrm.), p. 293.

Two specimens, not differing from one from Brazil in the Bremen collection.

Long. al.	caud.	rostr.	tars.	
3″ 5‴	2″ 3‴	6‴	9‴	(Trinidad.)
3 6	2 4	6	9	(Brazil.)
3 4	2 3	6	9½	(*glaucocolpa*, Venezuela.)
3 10	2 8	5½	10	(*cyanoptera*, Brazil.)

In the Catalogue of Dr. Sclater's collection (p. 75) there is noticed from Trinidad *Tanagra glaucocolpa*, Cab. (Mus. Hein. p. 28), which is not mentioned by Dr. Léotaud. We possess a specimen of *Thraupis glaucocolpa* from Venezuela (Baranquilla); Cabanis notices this species from Caraccas. Its nearest ally is *Th. cyanoptera*, Vieill., but it is much smaller; breast and sides of the belly bright ultramarine-blue, the coverts of the primaries (in Cabanis's description erroneously described as "alula spuria") dark greenish blue, forming a well-defined mark on the wing; under tail-coverts dirty white.

Th. cœlestis, Spix (Av. Bras. ii. t. 55. f. 2), is by no means the same as *Th. episcopus*, L., as Cabanis suggests, but is a well-marked species, easily distinguished by the broad white apices of the tectrices of the secondaries, forming a white band across the wing. Dr. Sclater has already corrected this in his valuable Monograph. *Th. serioptera*, Sw. (An. in Menag. p. 313; Cab. M. H. p. 28), from Demerara, is undoubtedly the same as *Th. episcopus*, L., as the accurate description of Brisson (*Episcopus avis*) shows. We possess this species also from Demerara.

76. Thraupis palmarum (Neuwied).

Thraupis olivascens, Licht.
Thraupis melanoptera, Hartl.
Thraupis palmarum et *melanoptera*, Scl. Mon. pp. 234, 235.
Thraupis melanoptera, Taylor, *l. c.* p. 82.
Thraupis olivascens, Léot. p. 295.

Three specimens.

Dr. Sclater and Von Pelzeln are of opinion that *T. melanoptera* may be only a local variety of *T. palmarum*, having inspected intermediate forms from Bolivia and Trinidad (Sclater). Having before me ten specimens from Brazil, Trinidad, Guiana, and Peru, I am not able to find out any constant difference, and must declare them all to be identical, although there exist some differences. The Brazilian bird has the remiges broadly edged externally with dull olive; in the Peruvian specimen (type of *T. melanoptera*) only a slight sign of these olive edgings is visible. These two birds seem to belong to two well-distinguished species. But there are other specimens from Demerara and Trinidad so intermediate in this respect that one cannot

say whether they belong best to *T. palmarum* or *T. melanoptera*. One specimen from Trinidad agrees throughout with the Peruvian one, the olive edgings being nearly altogether wanting; another from Demerara shows these edgings a very little defined; a Bahia specimen narrower than that from South Brazil. Young birds have the under parts uniform dull greyish olive-green, without the purplish-blue tint. In respect of size there is no reason for any separation.

Long. al.	caud.	rostr.	tars.	
3″ 11‴	2″ 9‴	5¼‴	c. 10‴	(Brazil.)
3 8	2 7	5½	9	(Bahia.)
3 9	2 7	6	9	(Trinidad.)
3 8	2 6	6	9½	(Trinidad.)
3 6	2 6	5½	9	(Trinidad.)
3 7	2 8	5½	9½	(Guiana.)
3 6	2 7	5	9	(Guiana.)
3 7	2 6	5¼	9½	(Peru.)

77. RAMPHOCELUS MAGNIROSTRIS, Lafr.; Scl. P. Z. S. 1856, p. 129, Cat. p. 79; Taylor, *l. c.* p. 82.

Ramphopis jacapa, Léot. p. 288.

Two specimens, old and young.

This species seems to differ from *R. jacapa*, L., in having the bill constantly stronger, especially the lower jaw is much broader and higher at the base; the coloration is quite the same in both species.

Long. al.	caud.	rostr. a front.	alt. mand.	tars.	
3″ 0‴	2″ 10‴	7‴	3‴	10‴	(*magnirostris*, Trinidad.)
3 2	2 0	6½	3	10	(*magnirostris*, Trinidad.)
3 1	2 10	6½	2¾	—	(*magnirostris*, Trinidad.)
3 0	2 8	6	2	9	(*jacapa*, Demerara.)
2 10	2 8	5½	2	9	(*jacapa*, Brazil.)

78. PHŒNICOTHRAUPIS RUBRA (Vieill.); Scl. Mon. P. Z. S. 1856, p. 120, Cat. p. 83; Taylor, *l. c.* p. 82.

Tachyphonus ruber, Léot. p. 297.

One specimen in old plumage, agreeing with a specimen (named *T. erythrolæma*, Bp.) from New Granada (Baranquilla) in the Bremen collection.

This species resembles very much *P. rubica* et *P. ignicapilla*, Licht. (*rubicoides* !!, Lafr.), but is somewhat smaller, while the tail especially is shorter; the under parts are brighter and more rose-coloured; besides it is easily distinguishable in having the inner web of the quills bordered with a clear rose, this bordering being in *P. rubica* dirty brownish red, in *P. ignicapilla* whitish.

Long. al.	caud.	rostr.	tars.	
3″ 6‴	2″ 8‴	6‴	10‴	(Trinidad.)
3 3½	2 8	6	10	(New Granada.)
3 7	3 3	6½	11	(*rubica*, Brazil.)
3 9	3 5	7	12	(*ignicapilla*, Guatemala.)

79. Tachyphonus melaleucus (Sparrm.); Scl. Mon. Tanagr. P. Z. S. 1856, p. 113; Taylor, *l. c.* p. 82.

Tachyphonus beauperthuyi (Bp.); Léot. p. 299.

Male and female (dark fulvous, beneath lighter), agreeing in every respect with specimens from Brazil. There exists a considerable variability in size in this widely distributed species.

80. Tachyphonus luctuosus, Lafr.; Scl. Mon. p. 114.

Tachyphonus albispecularis, Léot. p. 300.

One specimen changing the plumage; black, upper and under quill-coverts white; some of the remiges and the rectrices dark brown, edged with dirty olive-green on the outer web.

The identity of *T. albispecularis* with *T. luctuosus* has been already pointed out by Dr. Sclater (Ibis, 1867, p. 108).

Fam. Fringillidæ.

81. Cardinalis phœniceus, Gould; Scl. Cat. p. 100.

Two specimens, not differing from a specimen from Honduras in the Bremen collection.

Not included by Dr. Léotaud. Mr. Taylor doubts the occurrence of this species in Trinidad (Ibis, 1864, p. 83), which is now confirmed.

82. Cyanoloxia cyanoides (Lafr.).

Guiraca cyanoides, Scl. Cat. p. 101.

Similar to specimens from Cayenne.

This species is also not mentioned in Dr. Léotaud's work on the birds of Trinidad.

83. Volatinia jacarina (L.); Scl. Cat. p. 106; Taylor, Ibis, 1864, p. 83.

Tiaris jacarina, Léot. p. 312.

Spermophila splendens et *S. lugubris*, Hartl. Verz. 1844, p. 81.

Three specimens in old plumage.

There is no difference whatever between specimens from Mexico and Brazil, which are before me, as Dr. Cabanis has declared already (J. f. Orn. 1861, p. 2).

84. Spermophila minuta (L.); Scl. Cat. p. 104; Léot. p. 322; Taylor, *l. c.* p. 83.

An old male, similar to specimens from Cayenne, Guiana, and Columbia.

85. Spermophila lessoni, mihi.

Pyrrhula bouvronides, Less. Tr. p. 450.

Spermophila bouvronides, Scl. Cat. p. 104.

Spermophila bouvronoides, Léot. p. 318.

Three specimens, of which two show an indistinct white line from

the base of the upper mandible to the middle of the vertex, resembling much *S. lineola*, L. But in this latter species this white line is very conspicuous; whereas in *S. lessoni* the feathers are white at the base only, and therefore the white becomes almost hidden.

Dr. Léotaud gives a very good description; that of Lesson is imperfect, the white rump not being mentioned.

A hybrid name so bad as that given by Lesson cannot be admitted; therefore I have changed it.

86. Oryzoborus torridus (Scop.); Scl. Cat. p. 103.

Pitylus torridus, Léot. p. 283.

Two specimens in old plumage, agreeing accurately with the description by Dr. Léotaud. The white speculum is scarcely visible, the narrow white on the base of the primaries being nearly hidden and covered by the tectrices of the primaries. Gmelin in his diagnosis (S. N. p. 854), extracted from Scopoli (Annus I. Hist. Nat. 1769, p. 140), does not mention a white speculum; and therefore this species will be the true *O. torridus*, with which *Loxia nasuta* of Spix is undoubtedly identical, and apparently *Loxia torrida* of Neuwied and Burmeister. The two last-named naturalists do not speak precisely enough in respect to the white speculum to settle the question definitely.

We possess a specimen obtained from Verreaux (named *Sporophila torrida*, from Brazil), which I cannot take to be the true *S. torrida*. It is an old bird, and agrees in every respect with the specimens from Trinidad, except that all the primaries are white at the base, forming a conspicuous white speculum, being left uncovered for nearly 3 lines; besides, this specimen has across the middle of the throat a conspicuous band of chestnut, and the longest tectrices of the secondaries show also a chestnut apical shaft-spot.

I would take it without hesitation for the *Coccothraustes rufiventris*, Vieillot (Enc. M. p. 1014), who describes the white on the base of the primaries very well; but he does not say any thing of the chestnut gular cross band. Having only a single specimen before me, I feel unable to declare its novelty; but should these differences prove to be not accidental, I would propose to call it *O. specularis*.

Long. al.	rectr. med.	rostr. a front.	latit. ad bas.	tars.	
2″ 1‴	1″ 10‴	$5\frac{1}{2}$‴	$5\frac{1}{2}$‴	7‴	(*torridus*, Trinidad.)
2 3	1 $11\frac{1}{2}$	6	$5\frac{1}{2}$	7	(*torridus*, Trinidad.)
2 1	2 1	$5\frac{1}{2}$	$5\frac{1}{2}$	7	(*torridus*, Brazil.)

I may be allowed to remark that *Amaurospiza cærulatra*, Cabanis (J. f. Orn. 1866, p. 306), from Rio, is synonymous with *Sporophila mœsta*, Hartl. (Journ. f. Orn. 1853, p. 36). Dr. Cabanis's description, especially the singular form of the bill, agrees in every respect with the type in the Bremen Museum, except that he does not say that the under wing-coverts are partially white, and the remiges have also a whitish edging on the basal half of the inner web.

87. Sycalis brasiliensis, Gmel.; Scl. Cat. p. 125.

One specimen, agreeing with Brazilian specimens.

Not included by Dr. Léotaud, and never seen by Mr. Taylor (Ibis, 1864, p. 83).

Fam. Ramphastidæ.

88. Ramphastos erythrorhynchus (Gmel.); Burm. Thiere Bras. ii. p. 204, note.

One specimen, not different from Guiana specimens.

The size varies a good deal.

Long. al.	caud.	rostr.	tars.	
8″ 7‴	6″ 0‴	6″ 9‴	2″ 0‴	(Trinidad.)
9 0	6 0	6 8	2 0	(Guiana.)
8 3	5 9	5 9	1 11	(Guiana.)

This species is not included by Dr. Léotaud.

89. Ramphastos vitellinus, Licht.; Scl. Cat. p. 325; Léot. p. 325; Taylor, *l. c.* p. 93.

One specimen, agreeing with a Guiana specimen in the Bremen collection.

90. Pteroglossus araçari, L.; Scl. Cat. p. 325.

One specimen, similar to another from Guiana.

Dr. Léotaud does not notice this species from Trinidad. The *P. wiedii*, Sturm, is very closely allied, and can be distinguished only by a slight difference in the markings on the upper mandible, as has been pointed out very minutely by Mr. Sturm (Monogr. Ramph. 4 Heft). *P. araçari* is not confined in its distribution to Guiana and Northern Brazil; for Prof. Burmeister (ii. p. 208) got the true *P. araçari* in Minas Geraës. The black stripe along the culmen varies in extent; in our Guiana specimen it is $5\frac{1}{4}$‴ broad, in the Trinidad one $5\frac{1}{2}$‴, in the Brazil specimen (*P. wiedii*) 4‴. The size is also variable.

Long. al.	caud.	rostr.	tars.	
5″ 6‴	6″ 0‴	4″ 6‴	16‴	(Trinidad.)
5 7	5 9	4 0	17	(Guiana.)
5 10	6 0	3 9	16	(*wiedi*, Brazil.)

Dr. Cabanis has separated a conspecies from Venezuela (*P. formosus*, Journ. f. Orn. 1862, p. 332), said to be different from *wiedii* in having the chin and throat dark red-brown, the black stripe along the culmen narrower, and in its larger size (the measurements are, unfortunately, not noticed). I doubt whether these differences, based on a single specimen, are of specific value; the dark reddish-brown tinge on the ear-coverts, on the chin and throat, is also visible in our Brazilian specimen, and, as remarked by the Prince of Wied, is peculiar to the female.

I may be allowed to append some remarks with respect to the synonymy of two *Ramphastidæ*.

Ramphastos piscivorus, L.

Ramphastos carinatus, Sw.; Scl. Cat. p. 324.

From this well-known species are not separable *R. brevicarinatus*, Gould (Mon. ed. 2, t. 3), and *R. approximans*, Cab. (Journ. f. Orn. 1862, p. 333), as already stated by Mr. Salvin (P. Z. S. 1867, p. 156). A careful comparison between specimens from Guatemala, Costa Rica, and New Granada has convinced me that Mr. Salvin is quite right, although Mr. Lawrence (Ann. L. N. H. N. Y. ix. p. 129) holds the contrary opinion. Our Guatemalan specimen has the yellow on the jugulum bordered very narrowly with red; in the New-Granada one this red bordering is more defined, and in the Costa-Rican bird still broader. But this is by no means a specific character; for the figure of Mr. Sturm, from a Mexican specimen, shows the red band still broader than those from Costa Rica. The measurements are also variable.

Long. al.	caud.	culm.	tars.	
7″ 6‴	5″ 10‴	5″ 0‴	23‴	(Guatemala.)
7 0	5 5	4 2	22	(New Granada.)
7 6	6 0	4 2	21	(Costa Rica.)
8 6	6 9	5 9	22	(♂, Mexico, ap. Sturm.)
—	—	4 0	—	(♀, Mexico, ap. Sturm.)

Ramphastos ambiguus, Sw.; Scl. Cat. p. 325.

Our specimen from New Granada agrees in every respect with the description and beautiful figure by Mr. Sturm (Heft iv. t. 1. fig. inf.), taken from a male specimen from Peru (Tschudi). The separation of the New-Granada bird (*R. abbreviatus*, Cab. Journ. f. Orn. 1862, p. 334) has no grounds in my opinion. The purple-reddish tinge on the breast, noticed as the chief character for *R. abbreviatus*, is not visible in our specimen, and again occurs in Peruvian specimens, as stated by Mr. Sturm.

Long. al.	caud.	culm.	tars.	
8″ 10‴	5″ 6‴	6″ 0‴	24‴	(New Granada.)
8 10	—	6 3	—	(Peru, ap. Sturm.)

Dr. Cabanis gives the length of bill as only a little more than $4\frac{1}{2}''$; but it may be remembered that in most of the members of the *Ramphastidæ* the length of bill varies considerably, especially with respect to the two sexes and the younger birds.

The southern form of *R. toco*, which Dr. Cabanis named *R. albogularis* (J. f. Orn. 1862, p. 334), has been declared not specifically different by Von Pelzeln (Orn. Bras. iii. p. 233, note 2).

Fam. Psittacidæ.

91. Conurus pertinax (L.); Finsch, Mon. i. p. 506.

One specimen, in the plumage of *C. chrysophrys*, Sw., and agree-

ing with the specimen described by me (Pap. p. 512) from Brazil in Mr. Lawrence's collection. The olive-brownish feathers on the regio parotica blend into orange, the bluish feathers on the sinciput are mixed with some of orange colour, showing again a change from the plumage of *C. æruginosus* into that of the true *C. pertinax*.

This species and the following are not recorded by Dr. Léotaud. Mr. Taylor also did not obtain this species in Trinidad (Ibis, 1864, p. 94).

92. Brotogerys tuipara (Gmel.); Finsch, Mon. ii. p. 105.

One specimen, not different from specimens from Guiana, Surinam, and Brazil.

93. Pionias menstruus (L.); Finsch, Mon. ii. p. 441; Léot. p. 329.

A younger specimen, in the plumage described as *Pionus corallinus*, Bp. (*vide l. c.* p. 444).

94. Psittacula cingulata (Scop.); Finsch, ii. p. 677.

Psittacula batavica, Léot. p. 331; Taylor, *l. c.* p. 94.

One specimen of this species, which is apparently confined to the island of Trinidad.

Dr. Léotaud notices only five species of Parrots from Trinidad; but I am acquainted with twelve said to come from this island. They are:—

Sittace macavuana (Gmel.)	Finsch, Papag. i.	p.	415.	Léot. p. 557.
—— *hahni* (Sou.)	,,	,,	,,	427.	British Museum.
Conurus pertinax (L.)	,,	,,	,,	506.	British Museum.
—— *cyanopterus* (Bodd.)	,,	,,	,,	538.	Coll. Sclater.
Brotogerys tuipara (Gmel.)	,,	,,	ii. p.	105.	Coll. Kohlman.
Pionias menstruus (L.)	,,	,,	,,	441.	Léotaud.
Chrysotis festiva (L.)	,,	,,	,,	511.	Coll. Sclater.
—— *amazonica* (L.)	,,	,,	,,	570.	*Ps. agilis*, Léot. p. 327.
—— *ochrocephala* (Gmel.)	,,	,,	,,	584.	British Museum.
Psittacula passerina (L.)	,,	,,	,,	648.	Coll. Sclater.
—— *cingulata* (Scop.)	,,	,,	,,	677.	Léotaud.
—— *hueti* (Temm.)	,,	,,	,,	685.	Léotaud.

Fam. Picidæ.

95. Picus melanoleucus, Gmel.; Sund. Consp. Av. Pic. 1866, p. 5.

Dryocopus albirostris, Léot. p. 334.

One female, as figured by Malherbe, tab. 4.

96. Picus lineatus, L.; Sund. *l. c.* p. 7.

Dryocopus lineatus, Léot. p. 336.

Male and young male, not different from specimens from Brazil and Guiana (Demerara).

97. Picus cinnamomeus, Gmel.; Sund. *l. c.* p. 85.

Celeus cinnamomeus, Scl. p. 336; Léot. p. 338; Taylor, *l. c.* p. 93.

Male and female.

98. Picus rubiginosus, Sw.; Sund. *l. c.* p. 69.

Chloronerpes rubiginosus, Scl. Cat. p. 339; Léot. p. 339; Taylor, *l. c.* p. 93.

One male, as figured by Malherbe, t. 89. f. 4. The measurements are smaller than those noticed by Dr. Cabanis (Mus. Hein. iv. p. 162).

Long. al.	caud.	rostr.
4″	2″ 3‴	c. 9‴

Fam. Cuculidæ.

99. Crotophaga major, L.; Scl. Cat. p. 320; Léot. p. 358; Taylor, *l. c.* p. 93.

One specimen in old plumage, in every respect similar to Brazilian ones.

100. Pyrrhococcyx circe (Bp.).

Pyrrhococcyx mehleri, Cab. M. H. p. 84.
Piaya mehleri, Scl. (nec Bp.) p. 322.
Piaya cayana, Léot. p. 346; Taylor, *l. c.* p. 93.

One specimen, agreeing with a Guatemala specimen in our collection.

101. Pyrrhococcyx rutilus (Vieill.).

Piaya minuta, Scl. Cat. p. 322; Léot. p. 349.

One specimen, similar to Guiana specimens.

102. Diplopterus nævius (L.); Scl. Cat. p. 321; Léot. p. 343; Taylor, *l. c.* p. 93.

One specimen, not different from Brazilian and Guiana birds.

Order COLUMBÆ.

103. Peristera rufaxilla (Rich.); Léot. p. 371; Taylor, *l. c.* p. 94.

Peristera frontalis (Temm.); Burm. S. Uebers. iii. p. 305.

One specimen, agreeing with specimens from Brazil and Guiana (Demerara).

Order GRALLÆ.

104. Charadrius virginianus, L.; Burm. iii. p. 357.

Squatarola helvetica, Léot. p. 389.
Pluvialis fulvus americanus, Schleg. Mus. P.-B. *Cursores*, p. 53.

One specimen in change of the plumage; the under parts being mixed with large patches of black.

Long. al.	caud.	rostr.	tars.	tib. med.	dig. med.
6″ 9‴	2″ 2‴	9‴	18‴	9‴	11½‴

As far as I can judge from a few specimens, the Golden Plover of America, most nearly allied to the *C. fulvus*, Gmel., of Eastern Asia, is a distinct species, characterized by the longer wings. But whether this character is constant I hesitate to declare with certainty, not having compared specimens enough.

105. Charadrius semipalmatus, Bp.

Charadrius brevirostris, Neuw. Beitr. iv. p. 769; Burm. iii. p. 359.

Charadrius semipalmatus, Léot. p. 392; Schleg. Curs. p. 30.

Three specimens; two in winter dress, the third in full summer plumage. There is no difference in specimens from Brazil and from the United States.

106. Totanus semipalmatus (Gmel.); Léot. p. 457; Schleg. *Scolopaces*, p. 76.

Catoptrophorus semipalmatus, Bp.

One specimen in winter plumage, agreeing with North-American specimens.

107. Actitis macularius (L.); Schleg. Scolop. p. 83.

Tringoides macularia, Léot. p. 461; Taylor, *l. c.* p. 95.

One specimen in the dress supposed to be that of the young, having the under parts uniform white, unspotted, quite the same as in our *A. hypoleucus*, with which it may be easily confounded at first sight. But there exists a very good character in the markings of the outer tail-feather—in *A. macularius* only the outer web being distinctly barred with white and black, the inner web obscure greyish brown, instead of being both barred regularly with black as in *A. hypoleucus*.

108. Tringa semipalmata, Wils.

Ereunetes petrificatus, Ill.

Tringa pusilla (L.); Schleg. Scolop. p. 55.

Heteropoda semipalmata et *H. longirostris*, Léot. pp. 477, 480.

Eureunetes mauri et *E. minor*, Gundl. J. f. Orn. 1856, pp. 419, 420.

One specimen in winter dress, which agrees in every respect with specimens from Texas, Cuba, and Sitka. The variability in the length of the bill has been noticed already by Professor Baird (B. N. Am. p. 725). Our Cuban specimen (*T. mauri*, Bp.) has the bill 8‴ long, like the Trinidad one (8‴ *E. minor*, Gundl.); in the Texan specimen the bill measures 9‴; and in the one from Sitka 11¼‴, as noticed for *T. mauri* by Dr. Gundlach. The existence of inter-

mediate specimens does not allow us to separate the long- and short-billed specimens as different species.

109. Porphyrio martinica, L.; Burm. Syst. Uebers. iii. p. 392; Léot. p. 501; Taylor, *l. c.* p. 96.

Gallinula martinica, Schl. *Ralli*, p. 38.

An old bird, not different from specimens from Brazil and North America.

110. Cancroma cochlearia, L.; Burm. iii. p. 404; Léot. p. 436.

Two specimens in full dress. There exists a considerable variability in the size of the bill in this species.

rostr. a front.	lat. rostr.	
3″ 0‴	20‴	(Trinidad.)
2 8	18	(Trinidad.)
3 1	20	(Brazil.)
3 3	21	(Mexico.)

111. Ardea brasiliensis (L.); Burm. iii. p. 410; Léot. p. 426.

An old bird, exactly the same as Brazil specimens. Dr. Léotaud describes this species in an excellent manner, as usual.

112. Ardea scapularis, Ill.; Burm. iii. p. 411.

Ardea grisea (Bodd.); Léot. p. 421.
? *Butorides virescens*, Taylor, *l. c.* p. 95.

One specimen in full dress.

113. Ardea cærulea, L.; Burm. iii. p. 414; Léot. p. 410; Taylor, *l. c.* p. 95.

Florida (!) *cærulea*, Baird, B. N. Am. p. 671.

Two specimens—one in the slaty-blue plumage of the old bird, the other entirely white. This latter has no elongated feathers on the scapulars or the lower neck, and is evidently a young bird.

114. Ardea leucogaster, Gmel.; Schleg. M. P.-B. *Ardeæ*, p. 9; Léot. p. 424.

Demiegretta ludoviciana, Baird, B. N. Am. p. 663.

One specimen in the plumage of the young.

Order ANSERES.

115. Dendrocygna autumnalis (L.); Burm. iii. p. 436, Anm. 2; Léot. p. 507.

One specimen, agreeing with a specimen from Jamaica in the Bremen collection.

4. Notes on *Lanius excubitor* and its Allies. By H. E. Dresser, F.Z.S. &c., and R. B. Sharpe, F.L.S., Libr. Z.S., &c.

In examining the European Shrikes with a view to determine the species which really belong to the European fauna, we have found so much confusion existing that we have thought it necessary to make a few remarks on the Great Grey Shrikes and their geographical distribution; and we take the present opportunity of adding some notes respecting all the species of true *Lanius* allied to our own Great Grey Shrike (*Lanius excubitor*). With this view we have collected together a considerable series of Grey Shrikes from different parts of the world, and we venture to submit the following observations for the careful consideration of ornithologists; and, at the same time, we shall be extremely obliged for any additions or corrections to the views expressed by us in the present paper.

The following diagnostic table will show the characters of all those species which we consider to be fully established :—

a. scapularibus conspicue albo marginatis.
  a'. rostro et pedibus nigris, vel nigricantibus.
    a''. fascia alari alba duplici distincta ..... 1. *excubitor*.
    b''. fascia alari alba una.
      a'''. subtus semper vermiculatus ..... 2. *borealis*.
      b'''. subtus haud vermiculati.
        a''''. majores: supra saturate plumbei.
          aa. subtus plumbeus ..... 3. *algeriensis*.
          bb. subtus pulchre roseo indutus ..... 4. *meridionalis*.
        b''''. minores: supra cinerei.
          cc. pedibus gracilibus: secundariorum pogonio interno nigricante..... 5. *ludovicianus*.
          dd. pedibus crassis: secundariorum pogonio interno albo ..... 6. *lahtora*.
  b'. rostro et pedibus pallide brunnescenti-corneis ..... 7. *pallidirostris*.
b. scapularibus dorso concoloribus.
  a'. rectrice extima omnino alba ..... 8. *minor*.
  b'. rectrice extima versus apicem nigra..... ..... 9. *excubitorius*.

1. Lanius excubitor.

Above generally light blue-grey; forehead, extending backwards over the eye, pure white; lores, feathers under the eye, and ear-covers black; scapularies blue-grey, conspicuously edged with white; wing-coverts black, the least ones for the most part grey, the primary coverts and occasionally some of the greater coverts narrowly edged with greyish white; primaries black, white at the base on both inner and outer webs; secondaries black, the outermost white at the base on both the inner and outer web, thus forming a double bar on the wing; the secondaries conspicuously, and the primaries occasionally, tipped with white, the latter sometimes narrowly edged with the latter colour on the outer web; rump and upper tail-coverts greyish white; tail black, tipped with white, the latter colour gradually predominating towards the outer feathers,

the two outermost being almost entirely white; cheeks and the whole of the under surface of the body pure white; legs slender, dark brownish black; bill black.

Female. Similar to the male, but the under parts greyish and exhibiting slight traces of transverse vermiculations.

Young. Much duller in plumage, the black parts being mixed with brown, the under parts dirty greyish white; bill and feet brown.

This Shrike appears to vary very much according to age, the wing-coverts, forehead, and rump being of a much purer white in some specimens. The slender legs and double bar on the wing render it easily distinguishable from *L. lahtora*, which very old and pallid specimens at a first glance somewhat resemble. From *Lanius borealis* it is distinguishable by the absence of vermiculations on the breast and the double bar on the wing. The latter character, indeed, seems to be peculiar to *Lanius excubitor* alone; but we would remark that it is only gradually assumed, and, though very distinct in the adult bird, is only feebly developed and sometimes hidden by the greater wing-coverts in young specimens. It can, however, be almost always discovered on close examination.

The range of the present species extends over the northern and central portions of the Palæarctic Region as far north as the birch and willow are found. In the south of Europe it is only a winter migrant. To the eastward its range is yet undetermined; for though the Siberian travellers record it as being met with throughout Siberia, we find that the specimens collected on the Amoor and marked *Lanius excubitor* by the Russian naturalists are *L. lahtora*, as hereafter mentioned. The bird which occurs in Central Asia is also of the latter species.

We have already stated that *L. excubitor* is migratory in the South of Europe. Dr. von Heuglin states that it is a rare bird in North-eastern Africa, but he has only observed it in the winter in Egypt, and killed it in Arabia Petræa. We fully endorse his opinion, subsequently expressed, that it is probable that many of the observations as to the occurrence of the Great Grey Shrike in North-eastern Africa, made by Brehm, Rüppell, and Hemprich and Ehrenberg, refer to some of the allied species. We are inclined to question Mr. C. W. Wyatt's assertion ('Ibis,' 1870, p. 12) that *Lanius excubitor* is common in the Sinaitic peninsula; but as so good an observer as Dr. von Heuglin expressly states that he has himself shot it in that locality, we feel bound to admit its range so far south. We are, however, sceptical enough to be very anxious to see a *specimen* of true *L. excubitor* from the shores of the Mediterranean or North-eastern Africa.

2. Lanius borealis.

Lanius borealis, Vieill. Ois. de l'Amér. Sept. pl. 50 (1807); Swains. Faun. Bor.-Am., Birds, p. 111, pl. xxxiii. (1831); Aud. Syn. p. 157 (1839); *id.* B. of A. iv. p. 130 (1839); Gray Gen. of B. i. p. 294 (1847); Cass. Proc. Phil. Acad. 1857, p. 212; Jones, Nat. Hist. of Berm. p. 51 (1857); Max. Journ. f. Orn. 1858, p. 190.

Collyrio borealis, Baird, B. of N. Amer. p. 324 (1858); Coop. & Suckl. Pac. R. Rep. xii. pt. 2, p. 188 (1860); Baird, Rev. N. Am. B. p. 440 (1864); Coues, Proc. Phil. Acad. 1866, p. 73; Lord, Nat. in Vanc. Isl. ii. p. 295 (1866); Sam. B. of N. Engl. p. 269 (1867); Gray, Hand-l. of B. i. p. 391 (1869).

Lanius septentrionalis, Bonap. Sp. Comp. p. 30 (1827); *id.* P.Z.S. 1837, p. 112; *id.* Consp. Gen. Av. i. p. 363 (1850); *id.* Rev. et Mag. 1853, p. 294; Cass. Proc. Phil. Acad. 1857, p. 213; Murray, Edinb. N. Phil. Journ. ix. p. 223 (1859).

Lanius excubitor (err.), Forst. Phil. Trans. lxii. p. 382 (1772); Wils. Amer. Orn. i. p. 74 (1808); *id.* ed. Jard. i. p. 73 (1832); Aud. Orn. Biogr. ii. p. 534 (1834).

Above French grey, paler on the lower back as it approaches the rump, which, with the upper tail-coverts, is pure white; a narrow line of white extends across the forehead; ear-coverts jet-black; scapulars pale grey, tipped with white; least wing-coverts grey, tinged with rusty; wing-coverts black, the outer ones tinged with brown; quills dark blackish brown, white at the base of the inner web, the base of the outer web of the primaries white, showing a small white alar bar; secondaries tipped with white; tail black, all the feathers, except the two centre ones, white at the extreme base, and all tipped with white, this colour occupying more of the apical portion of each feather till the outermost, which are white along the outer edge and for the greater part of the inner web; under surface dull white, minutely barred with narrow transverse vermiculations, which become less distinct towards, and are sometimes absent on, the lower abdomen and under tail-coverts; bill dark horn-brown; feet black. Total length 9 inches; of bill from front 0·7, from gape 1·1; wing 4·5; tail 4·2; tarsus 0 9.

Female. Similar to the male, but has all the colours less intense, and the whole plumage tinged with ashy brown. There is also, perhaps, not quite so much white on the tail.

This is the most powerful species of the genus *Lanius*, and possesses a most extended range, as it is known to inhabit the whole of the North-American continent from the extreme north down as far south as the Mississipi and Missouri valleys. With regard to its possible occurrence in North-eastern Asia, we adduce the following facts, which are likewise referred to by Prof. Baird (Rev. Am. B. p. 442).

Pallas (Zoogr. Rosso-As. i. p. 401) describes a large Grey Shrike which he obtained on the Lena and Jenesei rivers, and which he considers to be different from *Lanius excubitor*. All ornithologists seem to coincide in the same opinion, viz. that the *Lanius major* of Pallas is only a large race of *L. excubitor*; but after comparing skins of the North-American *L. borealis* carefully with Pallas's description, we think that there is every reason to believe that this was the bird intended by the above author. Nor is there any improbability in this supposition; for the recent observations of ornithologists are proving the great similarity of the faunæ of Eastern Siberia and North-Western America, and we now know that many species are common to these two localities. At all events it seems

reasonable to suppose that Pallas had good grounds for the separation of his *L. major*; and the subject is well worth the investigation of ornithologists. We may be allowed to draw particular attention to the stress which Pallas lays on the conspicuous cross-barring, which forms so distinctive a character in *Lanius borealis*.

Radde (Reis. Süd-Ost Sib. ii. p. 274) refers to *Lanius major* of Pallas, which he considers to be only *L. excubitor*. We do not think he is right here; for apparently he had no specimens from the locality where Pallas obtained his bird, and this must be an absolute condition for the correct settlement of the question. Von Schrenk never mentions it; and we consider that our suggestion recorded above will very probably be confirmed by future observation.

3. Lanius algeriensis.

Lanius algeriensis, Less. Rev. Zool. 1839, p. 134; Bonap. Rev. et Mag. de Zool. 1853, p. 293; Tristr. Ibis, 1859, p. 159; Salv. Ibis, 1859, p. 312; Taczan. J. f. O. 1870, p. 48.

Lanius meridionalis, Malh. Cat. Rais. Ois. de l'Algérie, p. 9 (1846); Drake, Ibis, 1867, p. 425.

Above dark blue-grey, the edge of the scapulars white; least wing-coverts grey, the rest jet-black; primaries black, white at the base, forming a very distinct white speculum, the secondaries paler on the inner web, conspicuously tipped with white; tail black, the middle feathers just tipped with white, the others black at the base, but the white predominating towards the external feathers; a narrow line over the forehead, loral space and ear-coverts black; entire under surface grey, paler on the throat and just under the ear-coverts; under wing- and tail-coverts whitish; bill and feet black.

Although closely allied to *Lanius excubitor* and *Lanius meridionalis*, there is no doubt that the present species is quite distinct from both. The bill is slightly shorter and stouter than in either of these last-named species; and the general appearance is such that we had no difficulty in distinguishing old and young specimens of *Lanius algeriensis* when mixed indiscriminately with a series of twenty specimens of *Lanius excubitor* of all ages. The back of the present bird is very much darker than that of any *Lanius excubitor*, while the uniform light plumbeous colour of the underparts effectually distinguishes it.

The differences between *Lanius algeriensis* and *Lanius meridionalis* we have pointed out in treating of the latter bird.

We have quoted but very few references for this species, as so much confusion has existed with regard to its distinctness from *L. meridionalis* and *L. dealbatus*; but there is no doubt that Dr. Tristram and Mr. Salvin (*l. c.*) refer to the true *L. algeriensis*, as their remarks respecting the geographical distribution of the species in Algeria are fully borne out by the investigation of subsequent observers. The present bird seems to be a resident species in Algeria.

Herr L. Taczanowski (*l. c.*) states that *L. algeriensis* is very common on a large plain near the Fezzara Lake. In suitable localities it is found on the northern slope of the Atlas.

4. Lanius meridionalis.

Above dark plumbeous; scapulars somewhat lighter and having the extremities white, which show a distinct white mark when contrasted with the dark grey of the upper surface of the body; quills black, the inner web white at the base, the outer web of the primaries also white at the base, forming a small white alar bar, the secondaries tipped with white; tail black, all but the two centre feathers tipped with white, the latter colour occupying more of each feather until the two outermost, which have the outer edge of the feather almost all white as well as the apical half of the feather; a very narrow line of feathers along the base of the forehead, extending backwards over the eyes and forming an indistinct superciliary streak, white; loral space and ear-coverts black, the latter having the shafts rather distinct, which gives them a somewhat hoary appearance; cheeks and chin white; rest of the under surface of the body rose-colour, grey on the flanks; vent and under wing- and tail-coverts white; bill and feet black. Total length $9\frac{2}{10}$ inches, of wing $4\frac{2}{10}$; tail $4\frac{8}{10}$; tarsus $1\frac{2}{10}$.

The female is precisely similar to the male; but the white ends to the scapulars are not quite so broad, so that there is not such a conspicuous white patch on these parts.

Our description is taken from a very fine male lent to us by Lord Lilford, who procured it in the Coto del Rey, Audalucia, in May, 1869.

This species is nearly allied to *Lanius algeriensis*, but differs in many important characters, viz. in the total absence of white over the eye and on the forehead in the latter species, also in the alar bar being much smaller in the present bird, and in the breast being rose-coloured, whereas in *L. algeriensis* it is plumbeous grey. The bill of this species is much longer and more slender than in its Algerian ally.

As far as our investigations have hitherto carried us, we cannot but consider that *Lanius meridionalis* is a species confined to the south of France, Spain, and Portugal, though it may possibly occur along the northern portion of the Mediterranean basin. Lord Lilford, who knows the species well, assures us that he shot one specimen in Corfu (*cf.* also 'Ibis,' 1860, p. 135) in April 1857, where, however, it was "far from common." This specimen he no longer possesses; and although we have used the utmost exertion to obtain specimens of the true *L. meridionalis* shot anywhere eastward of Spain, we have been unable to procure any. Dr. Salvadori kindly informs us that the bird called *L. meridionalis* by him in his 'Catalogue of the Birds of Sardinia' he has since discovered to be only *L. minor* in fully adult plumage; and he likewise expresses his belief that the occurrence referred to by Prince Bonaparte of a specimen of *L. meridionalis* in the neighbourhood of Rome is also open to question.

Dr. von Heuglin doubts the occurrence of this bird in North-eastern Africa, where it has been accorded a place on the authority of Von Müller (Journ. f. Orn. 1855, p. 409); and in this we heartily coincide with him.

5. Lanius ludovicianus.

Lanius ludovicianus, Linn.; Baird, Rev. of Am. B. p. 443.
Lanius excubitoroides, Sw.; Baird, *l. c.* p. 444.
Lanius elegans, Baird et auct. Amer. (*nec* Sw.).

Upper parts dark French grey; rump and upper tail-coverts lighter; scapulars broadly edged with white; quills black, the inner web white towards the base, the basal half of the outer web of the primaries white, forming a white alar bar; secondaries broadly tipped with white; tail black, the central feathers just edged with white, the next more broadly tipped, this latter colour predominating towards the external feathers, which are almost entirely white; a narrow band across the forehead, lores, feathers round the eye, and ear-coverts jet-black; whole underparts white, with occasional slight indication of transverse vermiculations; bill and feet black.

Professor Baird, in his elaborate 'Review of American Birds,' has gone very closely into the question of the specific distinctions between *L. ludovicianus* and *L. excubitoroides*; but we must confess that we can scarcely agree with even so good an authority on North-American birds as the learned Professor; and we base our opinion principally on the analogous changes of plumage through which all the other Grey Shrikes appear to pass. We have not, indeed, such an extensive series for comparison as Professor Baird has at his command in the Smithsonian Museum, but have no inconsiderable number of specimens before us from various localities in the United States and Mexico. Amongst these we have thoroughly typical *L. excubitoroides* and *L. ludovicianus* (based on Professor Baird's own descriptions) from the same locality, viz. San Antonio, shot by Mr. Dresser and Dr. Heermann.

In the British Museum there is a specimen sent to this country by Professor Baird, under the name of *Lanius elegans*, from Mexico. This bird was kindly shown to us by Mr. G. R. Gray; and we were glad to see it, as it confirms our opinion that the *Lanius elegans* of the American authors is nothing more than *L. ludovicianus*.

6. Lanius lahtora.

Collurio lahtora, Sykes, P. Z. S. 1832, p. 86 (descr. orig.); *id.* Journ. As. Soc. Beng. iii. p. 423 (1834); G. R. Gray, Hand-l. of B. i. p. 391 (1869).

Lanius lahtora, J. E. Gray & Hardw. Ill. of Ind. Zool. ii. pl. 31 (1833); G. R. Gray, Gen. of B. i. p. 290 (1847); Blyth, Cat. B. Mus. As. Soc. Beng. p. 151 (1849); Bonap. Consp. Gen. Av. i. p. 364 (1850); *id.* Rev. et Mag. de Zool. 1853, p. 294; Horsf. & Moore, Cat. B. Mus. E.-I. Co. i. p. 163 (1854); Jerd. B. of Ind. i. p. 400 (1862); Hartl. Ibis, 1859, p. 342; Heugl. Peterm. Mitth. 1861, p. 23; Beav. Ibis, 1865, p. 418; Blyth, Ibis, 1866, p. 367; Finsch & Hartl. Orn. Ost-Afr. p. 327 (1870); Heugl. Orn. N.-O. Afr. p. 483.

Lanius elegans, Swains. Faun. Bor.-Am. p. 122 (1831).

Lanius burra, Gray & Hardw. Ill. Ind. Zool. pl. 32 (1833).

Lanius excubitor, var. 3, Lath. Gen. Hist. ii. p. 7 (1822).

Lanius minor, Rüpp. Neue Wirb. p. 33 (1835, *nec* Gm.); *id.* Syst. Uebers. p. 62 (1845); Heugl. Syst. Uebers. p. 33 (1856).

Lanius orbitalis, Hempr. & Ehr. in mus. Berol. et Licht. Nomencl. Av. p. 12 (1854, *teste* Finsch & Hartlaub).

Lanius collurio (juv.), Heugl. Peterm. Mitth. p. 23 (1861); *id.* Journ. f. Orn. 1867, p. 285 (err.).

Lanius pallens, Cass. Proc. Acad. Nat. Sci. Philad. 1851, p. 245; *id.* Journ. Acad. Nat. Sci. Philad. 1853, p. 258, pl. 23 (juv.).

Collyrio pallens, Gray, Hand-l. of B. i. p. 391 (1869).

Lanius aucheri, Bonap. Rev. et Mag. de Zool. 1853, p. 294; Gray, Hand-l. of B. i. p. 391.

Lanius dealbatus, Defil. Rev. et Mag. de Zool. 1853, p. 289 (ad.); Bonap. Rev. et Mag. de Zool. 1853, p. 294; Taylor, Ibis, 1860, p. 199; Heugl. Syst. Uebers. p. 33 (1856); Adams, Ibis, 1864, p. 27; Taylor, Ibis, 1867, p. 57; Taczan. J. f. O. 1870, p. 48.

Lanius leuconotus, Brehm, Journ. f. Orn. 1854, p. 147; Heugl. Syst. Uebers. p. 33 (1856).

Lanius hemileucurus, Finsch & Hartl. Orn. Ost-Afr. p. 329 (1870).

Collyrio hemileucurus, Gray, Hand-l. of B. i. p. 391 (1869).

Lanius fallax, Finsch & Hartl. Trans. Zool. Soc.

Lanius meridionalis, Tristr. Ibis, 1862, p. 279; *id.* Ibis, 1867, p. 374 (=*L. lahtora*, juv.)

Lanius excubitor, Taylor, Ibis, 1859, p. 47; Tristr. Ibis, 1867, p. 364 (=*L. lahtora*, ad.); Wyatt, Ibis, 1870, p. 12.

Lanius leucopygus, Hempr. & Ehr.; Heugl. Orn. N.-O. Afr. p. 480.

Head and back pale French grey; a narrow frontal line, extending backwards and including the loral space, the feathers above and below the eye, and the ear-coverts, which are somewhat elongated and extend on to the sides of the neck, deep black; a faint line on the forehead above the black line, and extending over the eye, hoary white; scapulars French grey, broadly edged with white; least wing-coverts grey; rest of the wing-coverts black; primaries black, slightly tipped with white, the basal half white, forming a distinct alar bar, secondaries black, broadly tipped, and the whole of the inner web white; the outermost secondaries narrowly edged on the outer web with white; rump and upper tail-coverts white; two centre feathers of the tail on each side black, slightly tipped with white, the next broadly tipped with white, the next still more broadly with white, with the basal portion and the outer web entirely white, the two exterior feathers entirely white with black shaft; the whole underparts pure white; legs and bill blackish horn-colour.

The above description is taken from a very old bird from the Punjab, and agrees with an equally old specimen from Algeria (*L. hemileucurus*, Finsch & Hartl.) *in the minutest particulars*. Nor do these specimens alone coincide; for we have before us a large series, from localities ranging from Algeria to Palestine, which exactly

agree with specimens from different parts of India. The differences supposed by various authors to be of specific value appear to us to be nothing more than those caused by the relative age of the bird: thus *L. hemileucurus* of Finsch and Hartl. is a very mature bird; *Lanius pallens* of Cassin (=*L. dealbatus*, Defil.) is the ordinary adult; and *L. fallax* of Finsch and Hartl. is the young. In the young bird there is no great extent of white on the forehead, scapulars, and rump, nor are the underparts of so pure a tint. Young birds generally have the underparts tinged with grey.

We should not have ventured thus to unite species which have been reckoned distinct by some of the first ornithologists of the day, without sufficient material to warrant us in this determination; and we may state that we have examined a numerous series of specimens from all parts of Algeria, Tunis, Egypt, Abyssinia, Palestine, many parts of India, and even Amoor Land, from our own collections and those of the following noblemen and gentlemen who have placed their Shrikes at our disposal, viz. Lord Walden, Lord Lilford, Professor Newton, Rev. Dr. Tristram, Messrs. Sclater, Salvin and Godman, and Swinhoe, to whom we take this opportunity of returning our best thanks for their courtesy.

From all the other Shrikes this species is preeminently distinguishable by the thickset rough leg and white back. The only bird which at all approaches it is *Lanius algeriensis*, to which the young of *L. lahtora* bear a slight resemblance, but which could not for a moment be mistaken for it even in that stage of plumage, owing to the very dark tint of the head and back in *Lanius algeriensis*.

Mr. Swinhoe has very kindly lent us two specimens collected in the Amoor Land by Dr. Maack, the one adult, the other immature. The former, on comparison with very adult specimens of the so-called *Lanius hemileucurus* from Algeria, and old *Lanius lahtora* from the Punjab, is *absolutely similar in every respect*, while the young bird from the Amoor Land precisely agrees with a typical specimen of *Lanius fallax* from Abyssinia. Père David, in his list of Peking birds (Nouv. Archiv. iii., Bull. p. 35) states that he has obtained a large Shrike, which he calls *L. major*, Pall., rather rarely in that neighbourhood; and he also includes another species under the name of *L. meridionalis*, Temm., which, however, has been identified by M. Jules Verreaux as the young of *L. excubitor*. We think that the birds here mentioned belong to the same species as the Amoor bird in Mr. Swinhoe's collection. Père David says that the old bird has a tinge of pink on the breast. We have also noticed this in Mr. Swinhoe's specimen; but as it sometimes occurs slightly on adult birds from other localities, we do not affix any specific importance to the fact.

Lanius lahtora has probably the most extended range of any of the Grey Shrikes, occurring along the southern shores of the Mediterranean basin, through the countries bordering the Red Sea, Palestine, and thence throughout the whole of India extending northward to the Amoor country. We have seen specimens from Central

Asia, thus connecting its range from Palestine to India. This species is undoubtedly the southern representative of *Lanius excubitor* in the western Palærctic Region; but we have not sufficient authority to state clearly the range of this last-named bird in the eastern portion of the Palæarctic Region to give the exact extent in this direction, so that the point where the two species meet has yet to be determined. Throughout Northern Africa, from Algiers to Egypt, it is not uncommon, and in Palestine is the common Shrike of the country, according to Dr. Tristram (Ibis, 1867, p. 364), who, however, on this occasion confounded the bird with *Lanius excubitor*, as we find from an examination of the specimens collected by him, and kindly lent to us for the present paper.

In Algeria this species, according to Herr Taczanowski, takes the place of *L. algeriensis* on the southern slope of the Atlas and in the deserts.

We have the advantage of possessing in this country the type specimen of *Lanius elegans* of Swainson, which is preserved in the national collection. On a close examination this bird seems to be nothing more or less than *Lanius lahtora*, to which species we have accordingly referred it. Whether the identical specimen described really came from the Fur Countries as stated, can only be determined by further investigation in the locality whence the type specimen is said to have come; and this question will, doubtless, be set at rest some day by the American ornithologists. It seems possible to us that the Shrike in question may have come from some other locality altogether, or it may be a straggler from Northern Siberia into North-western America.

Before concluding our remarks on this species we may state that Dr. von Heuglin in his new work admits *Lanius leucopygus*, Hempr. & Ehr., and *L. lahtora* as two distinct species. The former name he assigns to the bird called *L. dealbatus* by most ornithologists: but we must protest against the resuscitation of the name *L. leucopygus*; for on turning to the passage quoted (Symb. Phys. *d*, *e*) we fail to find any account of the species, and we cannot allow this name to take precedence of *L. lahtora*, as Hemprich and Ehrenberg do not seem to be very clear on the subject and evidently regard their *L. leucopygus*, whatever it may be, as a hybrid.

7. Lanius pallidirostris.

Lanius pallidirostris, Cass. Proc. Acad. Nat. Sci. Philad. 1851, p. 244; *id.* Journ. Acad. Nat. Sci. Philad. 1853, p. 257, pl. 23.
Collyrio pallidirostris, Gray, Hand-l. of B. i. p. 391 (1869).
Lanius pallidus, Antin. Cat. Coll. Ucc. p. 56 (1865).

Head and back pale whitish grey; a line on the forehead and over the eye white; loral space dusky grey; ear-coverts black; scapulars edged with white; least wing-coverts greyish white, the rest black; quills brownish black, white at the base, the external web of the primaries at their base white, forming a distint alar bar; rump and upper tail-coverts greyish white; centre tail-feathers black tipped with white, the white predominating towards the outermost

feathers, which are almost entirely of the latter colour; cheeks and entire under surface of the body white; bill and feet pale yellowish horn-colour.

This bird is easily distinguishable from other allied species, not only by its pale plumage, but more particularly by the light colour of the beak; and hence its name.

It was described by Mr. Cassin from a specimen in the Museum of the Philadelphia Academy, said to have been obtained in "Eastern Africa." Our description is taken from a specimen in Mr. Sharpe's collection from Nubia (*Verreaux*); and the bird is probably confined to the Abyssinian subregion. Heuglin says that it occurs in Southern Nubia, Senaar, Kordofan, on the Nile, and in the warmer portions of Abyssinia to the Red Sea.

8. Lanius minor.

Adult. Above delicate French grey; wing-coverts black, the least ones mixed with grey; quills black, the inner web pure white at the base; the outer web of the primaries also white at the base, forming a broad white alar bar; the innermost secondaries narrowly tipped with the same colour; the four centre tail-feathers entirely black, the next two white at the base and tip, black in the centre of the feather, the next two similar, but with less black, and the two outer ones on each are entirely white; a broad black band across the forehead, extending backwards over the eye to the ear-coverts, which are also black; entire under surface white, tinged on the breast and sides of the body with delicate pink; bill and feet black. Total length 8 inches, wing $4\frac{7}{10}$, tail 4, tarsus $\frac{9}{10}$.

The above description is taken from an adult specimen in Lord Lilford's collection.

Lanius minor is generally distributed during the summer season throughout Central and Southern Europe, extending as far north as the Baltic provinces; but in winter it migrates to Southern Africa, whence a great many specimens have been forwarded to England by the late Mr. C. J. Andersson, principally from Damara Land. To the eastward it extends into Siberia, having been recorded as occurring there by Pallas under the name of *Lanius vigil*.

9. Lanius excubitorius.

Lanius excubitoroides, Prevost et Des Murs, Lefebr. Voy. en Abyss. p. 99, t. viii. (1849), *excubitorius* in plate.
Lanius excubitorius, Heugl. Orn. N.-O. Afr. p. 478.
Collyrio excubitorius, Gray, Hand-l. of B. i. p. 390 (1869).
Lanius princeps, Cab. Mus. Hein. Th. i. p. 73 (1850).
Lanius macrocercus, Defil. Rev. et Mag. de Zool. 1853, p. 290.
Lanius kiek, Vierth. Naum. 1852, pt. 2, p. 7; 1857, p. 103.

Above pale French grey; scapulars black; both upper and under wing-coverts black; quills black, the inner web pure white at the base, the outer web of the primaries also white at the base, thus forming a conspicuous alar bar; the innermost secondaries faintly tipped with

dirty white; rump and upper tail-coverts white; tail-feathers black, the basal half of all, even the centre ones, pure white; across the forehead a broad band extending back nearly to the middle of the head; loral space and ear-coverts black, this colour extending from the ear-coverts to the shoulder and forming a continuous black band; throat, cheeks, and whole underparts pure white, bill and feet black.

This bird is nearest allied to *Lanius minor*, which it somewhat resembles from the broad black band on the forehead, but is easily distinguishable from that and other allied species by the long parti-coloured tail, which never has the outer feathers pure white, but invariably deeply tipped with black, and also by its black under wing-coverts.

This species, like *L. pallidirostris*, seems to be confined to North-eastern Africa. Lord Walden has a specimen collected by Petherick on the White Nile, while our description is taken from a fine specimen from North-eastern Africa in Sharpe's collection.

5. List of Birds collected by Mr. Cuthbert Collingwood during a Cruise in the China and Japan Seas, with Notes. By R. Swinhoe, F.Z.S.

Mr. Cuthbert Collingwood, the author of the highly appreciated 'Rambles of a Naturalist,' brought home from his cruise in the China and Japan seas a collection of birds, captured for the most part at sea, and submitted them to Mr. Osbert Salvin. The latter gentleman placed them in my hands, and desired me to draw out a list of them, adding the collector's notes and any remarks I should like to make. This I have done, and now offer the results to this Society. Mr. Collingwood's notes and numbers are given between inverted commas.

1. Poliornis poliogenys (Temm. & Schleg. F. J.).

"No. 13. Hawk, male. Eye very black; iris yellow. Near south end of Formosa; seemed to be making a passage; a great many hovering round about the ship. Small crabs in crop. 26th March, 1864.

"No. 14. Hawk, female, caught same time as No. 13. Crop full of remains of shells, insects, and grass. Bird remarkably fat."

For a similar occurrence of this bird at nearly the same time of year, see 'Ibis,' 1867, p. 412.

2. Accipiter stevensoni, Gurney, Ibis, 1863, p. 447, pl. 11.

"No 46. Sparrow-hawk, a male. 11th May, 1866. N. lat. 30°50′, E. long. 123° 10′. Coast of China, near Saddle Island. Iris crimson; narrow belt outside of it under the eyelid; eyeball dark. Back slate-

colour; belly and legs mottled. Part of a Swallow in gizzard, and quantity of grass."

This specimen was submitted to Mr. Gurney for identification.

3. Budytes flava (L.).

No label. In nuptial dress with grey head, the eyebrow, chin, and line under ear-coverts being white.

4. Calobates boarula (L.).

"No. 45. Male. Iris with slight tinge of dark brown. Olive-green along the back. Breast and belly bright yellow. Tail white and green. Gizzard full of remains of insects. N. lat. 30° 50′, E. long. 123° 10′. Coast of China, near the Saddle Islands, 11th May, 1866."

5. Turdus fuscatus, Pall.

"Nos. 58 & 59. Thrushes, both young males. Nagasaki, Japan, 24th February, 1867."

6. Microscelis amaurotis (Temm. & Schleg.).

"Nos. 60 & 61. Nagasaki, Japan, 24th February, 1867."

7. Hirundo gutturalis, Scop.

"No. 24. A Swallow, male. Near Quelpart Island, N. lat. 32°, E. long. 127°, 16th April, 1865.

"No. 39. Female. N. lat. 23° 10′, E. long. 122° 5′. East coast of Formosa. Crop full of remains of insects."

8. Hirundo daurica, Pall., var japonica, T. & S. F. J.

"East coast of Japan, east of Boungo Island."

9. Tchitrea principalis (T. & S. F. J.).

"No. 42. 8th May, 1866. Male. Ring round the eye and cere and bill light blue; legs chestnut. N. lat. 25° 10′, E. long. 122° 40′. Coast of China."

In the live bird the legs also are blue, but get discoloured almost immediately after death.

10. Ruticilla aurorea (Pall.).

"No. 28. Male. Straits of Corea, 9th April, 1865."

11. Calamoherpe orientalis (Temm. & Schleg. F. J.).

No label.

12. Arundinax canturians, Swinhoe, Ibis, 1860, p. 52.

"No. 32. Male. Coast of China, off Foochow. N. lat. 25° 30′, E. long. 120° 10′."

13. Locustella ochotensis, Midd. Sib. Reise.

"No. 49. Male. 30th August, 1866. Saddle Islands."

14. Regulus japonicus, Bp.

"Nos. 20, 21, & 23. Tits or Honey-suckers; 21 and 22, females, 23, male. Japan Sea and Straits of Corea. 9th April, 1865."

The special labels are wanting; so one does not know to which individuals the numbers refer. All three have pale yellow crests, and look to be females.

15. Troglodytes fumigatus, Temm. & Schleg. F. J.

There is unfortunately no label.

16. Fringilla montifringilla, L.

"No 27. A male caught on the coast of Corea, N. lat. 34° 40′, E. long. 130°, 10th April; died 7th May, as we advanced south towards Hongkong, in N. lat. 27°.

"No. 28. Mountain-finch, male. Eye brown-black; iris dark grey. This bird was also kept in a cage, same as No. 27. Caught on east coast of Japan, N. lat. 39°, E. long. 142°, 7th November, 1864."

17. Eophona melanura (Gmel.).

"No. 26. Male. Shot, Woosung River, near Shanghai, China, 2nd May, 1865."

18. Cyanopica cyana (Pall.).

"No. 25. Male. Woosung River, near Shanghai, China. Crop full of rice. 3rd May, 1865."

19. Garrulus brandtii, Eversm.

"Female. Hakodadi, 4th November, 1865."

20. Turtur gelastes, Temm. & Schleg. F. J.

"No. 46. Male. Iris orange. N. lat. 33°, E. long. 127° 30′. 30th October, 1866."

"No. 56. Female. Nagasaki, 21st February, 1867."

21. Coturnix dactylisonans, Temm.

"No. 47. Male. Iris yellowish brown. N. lat. 33°, E. long. 127° 30′. 30th October, 1866.

"No. 48. Female. Caught the day after No. 47. Numbers of these birds are met with every year during the latter end of September and all October, making their way to the south."

The male has the black mark still showing on the throat. The female has a white throat.

22. Coturnix japonicus (T. & S. F. J.).

"No. 44. Iris hazel. Very fat when taken. Japan Sea. N. lat. 41°, E. long. 139°. 26th September, 1866."

The throat red, with no black mark.

23. Glareola orientalis, Lath.

"No. 17. Male. Iris chestnut; white semicircle round the lower eyelid; eye large and elongated; under wing-feathers red. N. lat. 19°, E. long. 120°. North end of Luzon, 20th April, 1865."

24. Tringoides hypoleucus (L.).

"No. 40. Female. 7th May, 1866. Eyes dark. Crop empty. N. lat. 24°, E. long. 122°. East coast of Formosa."

25. Buphus coromandus (Scop.).

"No. 38. Crane, female. 8th May, 1866. Gizzard containing remains of snails, and worms alive (seeming parasites), of pure white, about $\frac{3}{4}$ inch in length. Iris bright yellow; eyeball dark blue. N. lat. 25° 50′, E. long. 122° 50′. Coast of China."

26. Porzana erythrothorax, Temm. & Schleg. F. J.

"No. 54. Male and female. Iris crimson. N. lat. 32° 20′, E. long. 125° 80′. Between coast of China and the Corea. Body literally covered with fat."

27. Phalacrocorax carbo (L.).

"No. 45. Cormorant, female. Iris green; eye dark blue; yellowish green under the head. Very fat when caught. N. lat. 39°, E. long. 138°. Japan Sea, October 1866."

28. Sula fusca, L.

"No. 15. Gannet, female. Eye black; iris stone-grey. Small flying-fish in crop. Bird very lean. Feet and bill yellow. N. lat. 20°, E. long. 116°. China Sea. 14th April, 1864.

"No. 26. Gannet, male. 7th May, 1866. Eyeball indigo; iris straw-colour; light blue ring round the eye. N. lat. 24°, E. long. 122°. East coast of Formosa."

29. Larus melanurus, Temm. & Schleg. F. J.

"No. 20. Gull, female. Red circle round the eye. Shot in Hakodadi harbour, North Japan, March 1865.

"No. 42. Gull, gender uncertain. Red round the eye and base of the beak. Hakodadi, June 1866."

30. Sterna panayana, Scop.

"No. 121. "Hakodadi. 4th November, 1865."

Two others without labels. From North Japan one would rather have expected *S. fuliginosa*.

31. Anous stolidus (L.).

"No. 29. Male Noddy. Eye black; iris dark grey. N. lat. 28° 40′, E. long. 129° 30′. Loochoo Islands. July 1865.

"No. 38. N. lat. 23° 10′, E. long. 122°. North-east coast of

Formosa. *Sterna*, a male. Eyeball dark indigo; iris dark chestnut. Gizzard empty, collapsed."

32. Uria umizusume, Temm. & Schleg. F. J.

"No. 57. Diver, young male. Nagasaki. 24th February, 1867."

33. Phaleris tetracula (Pall.).

"Male. Eye grey. 19th February, 1865. N. lat. 40°, E. long. 142°. North-east coast of Japan."

6. On *Phoca grœnlandica*, Müll.: its Modes of Progression and its Anatomy. By James Murie, M.D., F.L.S., F.G.S., &c., late Prosector to the Society.

(Plate XXXII.)

Propulsion of mammals on land and on different substances, as is well known, is effected in a variety of ways; and the parts brought into contact with the solid matter are as diverse. Walking, running, leaping, bounding, hopping, creeping, &c. sufficiently express widely dissimilar modes of progression. Some raise the body in erect or semierect posture, as in Man and Kangaroos; others, and by far the greater number, carry the body horizontally above, and support it by the four feet. Some, as the Sloths, suspend the body, and slowly move along the boughs by successive clutches.

As regards the parts in opposition with the object moved on, the palms and soles respectively or together frequently form the fulcrum. The toes of the manus and pes, however, as often alone touch the ground; but the knuckles, rims of soles, and even tips of claws, as in the Three-banded Armadillo, are, in certain instances, brought into requisition as fulcra. The tail even assists as an occasional basis of support, and in such cases as the Spider Monkeys and Merian Opossum, the body is absolutely hung and swung forwards thereby.

But perhaps the oddest kind of movement, and almost sadly ridiculous one, is the shuffling, wriggling, belly-progressive gait of many of the Seal tribe on *terra firma*.

Several writers* have called attention to this peculiarity in the Common Seal, *Phoca vitulina*, and contrasted it with the very different walk of the other Carnivora. The Sea-lion (*Otaria*) by the the old Southern voyagers†, and the Walrus (*Trichechus*) by Arctic travellers‡, have each been described as walking waddling-fashion on all fours; and the living specimens lately in our Gardens have

* See the early Anat. Memoirs of the French Acad.; also "Sur les organes du mouvement du Phoque commun," by Duvernoy, Mém. du Muséum, 1822, p. 52.

† Capt. Cook, the Brothers Foster, Dampier, quoted by Duvernoy (*l. c.* p. 51), Péron & Lesueur, &c., besides Steller, who describes fully the northern species.

‡ Beechey's Voy. Lamont's 'Seasons with the Sea Horses,' &c.

C.Bertjeaux del et lith.

M&N.Hanhart imp.

PHOCA GROENLANDICA

brought the fact before our eyes. These two kinds of land-motion, abdominal and quadriplantigrade, are all, to my knowledge, that have been recognized among the family of Phocidæ.

Nevertheless a third sort of land-movement, intermediate between those mentioned, is the habit of certain Phocine species; and to call attention to this is the chief object of the present paper.

A few Greenland Seals (*Phoca grœnlandica*, Müll.) were purchased by the Society in May 1869; and then for the first time this species was exhibited in the Gardens to the public. To most observers, unacquainted with the varieties of Seals, these animals exhibited nothing to distinguish them from the Common Seal of our coast, if seen with the skin wet. But when dry they did show, even to the unpractised eye, a difference, in their whiter coats; and, instead of minute regular dark spots, irregular bands and slashes of a black hue intermingled with sparse circular spots arrested the attention. In some of the specimens, barely adult, at least not old, the broad loin-patch of a deep blackish shade was moderately developed—this being the marked external characteristic of the species, and, in fact, from which the popular names of Harp-seal and Saddle-back are derived.

Having given attention to the modification of walk and somewhat vermiform land-action betwixt the Otary, Morse, and the Common Seal, I was both surprised and delighted to find that the Saddle-back at times moved on the ground quite differently from either. A good idea of the difference of attitude of the two latter is best gathered from the illustration, Plate XXXII. It represents, from sketches taken of the live *P. grœnlandica*, one of these animals (that in the foreground) moving in its usual manner, after the fashion of the Common Seal—that is, belly-wise, the fore limbs tucked towards the chest, the hind legs thrust backwards and in apposition.

The remaining four figures, however, vary considerably in attitude; and each is characteristic of what I have oft witnessed in the Harp-seal, and I may add the "Bladder-nose" (*Cystophora cristata*), lately added to the collection, but never have seen in the Common and the Ringed Seal (*P. fœtida*). The Greenland Seal, in fact, very often uses its fore limbs, placing these on the ground in a semigrasping manner, and by an alternate use of them drags its body along. The hind legs meantime are either trailed behind slightly apart, or with opposed plantar surfaces slightly raised and shot stiffly behind. On uneven ground, or in attempting to climb, a peculiar lateral wriggling movement is made; and at such times, besides alternate palmar action, the body and the hind legs describe a sinuous semi-spiral or wave track, as shown in the figure to the left.

Dr. Pettigrew, in his admirable memoir on the mechanism of flight*, has carefully analyzed the swimming of the Seal, Sea-bear, and Walrus; and in my papers on the anatomy of the two latter I have alluded to their movements on land; so that further comparison here is unnecessary.

To the theory of evolution the matter I have been dilating on is

* Trans. Linn. Soc. vol. xxvi. (1867) p. 207.

an accession, inasmuch as gradation of limb-use is most easily traced throughout the Carnivore series. Take the Common Seal; and its limb-appendages on land are but of slight subservience to progression, the fore paws only occasionally being used among rocks. In the Harp and Bladder-nose Seals, the fore legs and paws, and, to a very moderate extent, the hind limbs are freely brought into action. Among the Otaries there is a very decided plantigrade mode of walk, the heels, however, being much restricted as to change of position. With a very similar style of walk and canter, the Walrus has more freedom of motion, from the extremities being less fixed. It is but an easy step to the Bears, flat-footed and moderately free-legged. A still further modification in manner of walk and limb-forms leads on through the Otters and Binturong to the more agile digitigrades, the Cat tribe.

For an excellent notice of the variation of colour, geographical range, migrations, &c. of this species of Seal, see P. Z. S. 1868, p. 416. The author, Mr. Brown, since the present plate was drawn, has called my attention to a very characteristic illustration of hundreds of these animals among the pack-ice, in the Swedish Expedition to Spitzbergen*. I was glad to find the artist has shown that the attitudes here noticed in confinement are precisely those *P. grœlandica* exhibits in a state of nature. Being ignorant of Swedish, I unfortunately cannot refer to the text.

It was not until I had well thought over this paw-creeping movement of the Northern Seal that I fully appreciated an incident related to me by my friend Mr. Charles Davidson, which he had been witness to in one of his arctic voyages. At more than a mile distance from their ship a solitary Seal was noticed lying dosing near an "escape-hole" on the ice. An Esquimaux thereupon, in his seal-skin garment and hood formed quite like the head of the animal he was in pursuit of, and with lance and rope-coil, slowly crawled towards the creature. For a while it apparently took little notice of him, but at last showed indications of being on the alert. The man by this time was still far off; but the moment he observed the Seal watching him, he advanced perfectly Seal-fashion, and whilst it steadily gazed, evidently mistaking him for one of its species, as he at times imitated to very life every phocine movement, he approached within a very short distance. Then suddenly starting up he sent his lance whirling into the creature's vitals ere it could scramble in safety to the blow-hole.

Without further digression I may state that from time to time, as the Greenland Seals succumbed to the changed conditions of confinement, I took the opportunity of examining their anatomy. I particularly made it a point to dissect the fleshy and tendinous structures, which I thought by organization would explain those peculiarities of land-progression above-mentioned.

I was fortunate in being able to compare, side by side, the bodies of *P. vitulina* and *P. grœnlandica*, and also placed before me some

* "Anteckningar om Djurlifaet i ishafvet snellan Spetsbergen och Gronland." Af Aug. Quennerstaedt. Kongl. Svenska Ak. Handl. 1868, Band vii. no. 3, p. 12, Taf. i. fig. 1.

carefully executed drawings of the limb-myology of *P. fœtida*. It is needless entering into detail; but the result was that I detected no special arrangement in the muscles and tendinous distribution, both of the pectoral and pelvic extremities, which could satisfactorily account for the powers of grasp and differentiated raised creeping movements.

In all three forms the flexor and extensor tendons agree in pattern and points of insertion. The small palmar and plantar muscles, including superficial and deep layers of interossei, are subdivided after the same fashion. As regards the shoulder and brachial muscles, there is no alteration in their implantation; and hence no change in mode of action is apparent. If any specific difference exists, it must be in the volume and strength of the individual parts. But this is a factor which, unless very decided, the eye cannot well appreciate; therefore to assume such is all that reasonably dare be ventured. Physiologically, it may be said there is more innervation; but that can neither be seen, weighed, nor measured.

I shall restrict my notes of the internal anatomy to a single specimen, premising that the differences in the others examined by me were slight—chiefly relating to partial or deeper segmentation of the lungs and length of intestine.

Meckel, in his 'Anat. Comp.,' merely incidentally alludes to *P. grœnlandica*, quoting the 'Naturhist. Bemerk. &c.,' of Thienemann; but I regret I have not been able to lay hands on this latter work.

In a young male which died of congestion of the brain the following admeasurements were taken by me:—Extreme length = 4 feet 3 inches. Of this, regionally, from the edge of the upper lip to the occiput was $9\frac{1}{2}$ inches; from the occiput to the tip of the tail $34\frac{1}{2}$ inches; from the occiput to the tip of the hind flipper $41\frac{1}{2}$ inches; the free part of the fore flipper $7\frac{1}{2}$ inches; and the free portion of the hind limb $10\frac{1}{2}$ inches.

The body weighed 41 lbs.; the skin when removed 6 lbs. 2 oz., and the viscera, including the tongue &c., 5 lbs. 2 oz.; the brain with its membranes and blood-vessels (the latter much congested), 8 ounces 2 drachms.

In the specimen under consideration the heart presented a well-defined bifid extremity, the cleft being almost half an inch deep. The long diameter of the heart from root to apex was 3 inches, and the greatest transverse diameter near the base $3\frac{3}{4}$ inches. Others of the Greenland Seals did not show quite so deep an apical incision; but in all, traces of separation at the point were discernible. I infer that in *Phoca grœnlandica*, at a comparatively ripe age, nearly if not quite adult, this fœtal stage of heart-cleft obtains. But latitude must be given to such a premise; for I have observed once in a young Porpoise, *Phocæna communis*, with a length of body as great as the Seals, that a distinct division of the apex existed. In the Harp-seal this cardiac scission is very median in position, as in the Dugong and Manatee, and not so laterally placed as I found it in the Common Porpoise.

The right lung was entire or without divisionary lobules; but the

left lung presented a slight incision or was very partially divided into two lobes.

The tongue, as is usual in the Seals, was terminally split rather than forked. The dorsal papillæ were very numerous and of small size.

The œsophagus had a length of 16 inches. As is the case in the Common Seal, the rather capacious stomach was cylindroid, and with the pyloric bend sharp; its long diameter was 11 inches. The small intestines from the pylorus to the cæcum measured 41 feet 5 inches, with an average diameter of $\frac{1}{2}$ an inch. As in *Phoca* generally, the cæcal diverticulum is simple, short, and wide. Including $\frac{1}{2}$ an inch of cæcum, the great intestines had a length of $18\frac{1}{2}$ inches; their diameter, $\frac{3}{4}$ of an inch at the cæcal end, gradually enlarges towards the vent, and is $1\frac{1}{4}$ inch at the rectum. The entire alimentary tube at this stage of growth is therefore about 45 feet $2\frac{1}{2}$ inches long.

The deeply divided liver precisely corresponds as to disposition, number, and size of the lobes, with those of the Ringed Seal (*P. fœtida*, Müll.) and to the Common Seal (*P. vitulina*); namely, there are five large elongate taper-pointed hepatic divisions, and two lobules —in all, seven lobes. The two to the left are the homologues of the left half of human anatomy; and the right half is represented by the three remaining large lobes; of these three the mesial two are equivalent to Professor Owen's cystic lobe. The Spigelian and caudate lobules are relatively small. The common bile-duct, derived from the pyriform gall-bladder, opens into the intestine an inch distant from the pyloric orifice.

The kidneys are compound or acinate; and externally large veins ramify superficially upon the renal capsule, as is the case in the Common Seal.

The generative organs comport to the type of Pinnipedia. The prostate gland is of moderate size; Cowper's glands are absent.

In passing, I may note that the vertebral formula is:—7 cervical, 15 dorsal, 6 lumbar, 4 sacral, and 13 caudal segments, or a total =45 vertebræ. Terminal caudal elements are often lost in museum skeletons; but in this case they were counted whilst attached by intervertebral substance and ligament.

7. On a probably new Species of *Tænia* from the Rhinoceros. By James Murie, M.D., F.L.S., F.G.S., &c., late Prosector to the Society.

The Cestoida, abundantly numerous among the ruminant section of the Artiodactyla, are by no means so common or well known in the non-ruminant division of that group. Regarding the Perissodactyla, its few families and genera have as yet not yielded many varieties of these Entozoa.

In the very lucid and capitally illustrated 'Introduction to Hel-

minthology,' Dr. Spencer Cobbold says, "The larger Pachyderms and Solidungulates harbour a few adult forms; but only the larvæ appear to be known in Swine; a true *Tænia*, however, has been described as occurring in the aberrant genus *Hyrax*." The same writer, in an examination of 122 different animals, which died in the Society's Gardens (1857–60), only came across two supposed new species of *Cysticerci* and a *Strongylus* among the Perissodactyles*.

Rudolphi in his 'Synopsis,' Diesing in his elaborate 'Systematic Treatise,' and Dujardin in his 'Hist. Nat. Helm.' make no mention of Tapeworm from *Rhinoceros*.

When Dr. Baird published his 'Catalogue of Species of Entozoa' (1853) there were comparatively few species in the series from the Ungulata; many additions have since been made; but still in the British-Museum collection at present there is no representative of Tæniadæ from the Rhinocerotidæ.

That gentleman, with his usual urbanity on all occasions, readily lends assistance when research in his department is sought; and I take this opportunity of thanking him for his many kindnesses.

A couple of years ago some dozen joints of what I may safely term an enormous Tapeworm were placed in my hands by Mr. Bartlett, they having been passed by the young male *Rhinoceros indicus* in the Gardens. I had drawings made of the most characteristic pieces thereupon, and before shrinkage ensued. These sketches are reproduced in the accompanying sketch (fig. 1). I searched carefully among the fragments, but did not discover a head. The cephalic segment (so essential for the identification of the species) being wanting, I waited, thinking, perchance, more pieces might afterwards be thrown out, and it among them. As not only a reasonable time, but a long period has now elapsed, and nothing further been obtained from the *Rhinocerotes* (for I understand the female when young exhibited symptoms of worms), I have less hesitation in publishing what I know (though imperfect data) than in postponing a notice until the tænoid head is forthcoming.

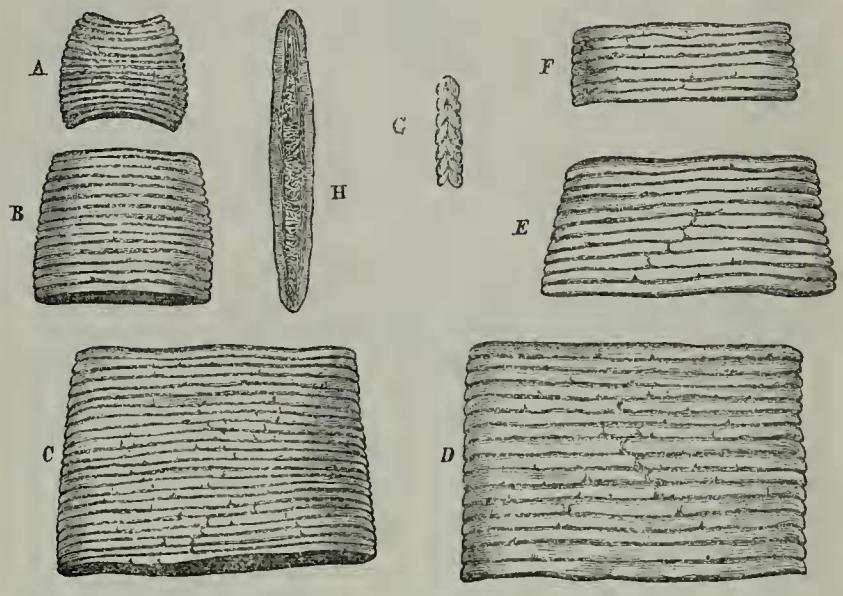
The largest proglottid joint among those obtained is that marked *D* in the woodcut; it is 1·6 inch broad and 1·1 inch long. The smallest of those figured (*A*) measures 0·6 across and 0·5 inch in extreme length. There was still another piece, 0·1 inch less in both dimensions; but this was put in spirits and shrunk before the drawing of the others was finished; so I have not thought proper to include it in the illustrations I now give. Its shape was similar to *A*; and both of these segments possibly were from the front part of the body. The sizes of different species intermediate between what I have mentioned are given in the outlines *B*, *C*, *E*, *F*.

I regard the worm under consideration as belonging to the genus *Tænia*, from the position of the genital apertures being lateral or marginal, and not mesially placed as is the case in *Bothriocephalus*.

* "List of Entozoa," P. Z. S. 1861, p. 117, and also p. 93 ("Cystic Entozoa"); but Cobbold since acknowledges that Leuckart has corrected him on the score of specific difference of one specimen obtained.

When more complete specimens are obtained, the characters, if a new species, may be better defined; but provisionally, until more is known, I propose to designate it *Tænia magna*, on account of its immense size or, rather, breadth.

Fig. 1.



A to *F*. Segments of *Tænia magna*? *G*. Serrate overlapping margin. *H*. Interior structure of a layer from a large joint. All about natural size.

TÆNIA MAGNA, sp. n.?

Segments of body pale-coloured, unequal in size, and large; flat, relatively thick, broader than long, and transversely ribbed or banded. The larger segments measure fully $1\frac{1}{2}$ inch broad and 1 inch long; the smaller segments have a diameter of an inch lengthwise and across; the latter with lateral convex margins, and concave attached surfaces; other pieces are cubical in outline, some parallelopiped, but the larger chiefly subquadrate. The free borders of the bands are wavy, at some points verging towards subcrenation. Here and there a band presents a partial fold on itself; the outer recurved margins of the one band partially overlap that behind, giving a somewhat lateral serrate character to each segment. Genital outlet apparently on each band, and opening at the lateral border (?).

Head and neck not known. Body supposed to increase from before backwards to middle, or beyond, and thence to diminish.

Habitat. Intestines of Rhinoceros (*R. indicus*).

Specimens deposited in the British Museum.

8. On a Case of Variation in the Horns of a Panolian Deer. By James Murie, M.D., F.L.S., F.G.S., late Prosector to the Society.

The variability in size, general contour, and number of snags in the horns of Deer is proverbial. Not only from youth to age do these change, but in the adult of a single species, as Blyth *, among others, has shown, the modifications occasionally are not a few. Notwithstanding the danger of error likely to arise from such an unstable character as differentiation in horn-contour of the Deer, numerous instances could be cited where naturalists have formed new species on such data; palæontologists have not been behind hand in following their example.

Whilst many supposed laws regarding malformations have from time to time been enunciated by those studying the subject, there yet remains much to be done ere the precise relations between mere variety and so-called abnormalities are cleared up.

For these reasons I have thought it useful to place the subjoined case on record.

A male Panolian Deer (*Cervus eldi* †) was presented to the Society by Mr. Grote through Colonel Phayre.

On the morning of the 28th May, 1868, this animal shed its horns. The right horn loosened and fell away from its burr in the natural manner; but the left one, instead of separating from the burr, tore this latter and a portion of the osseous cranium right off with it.

I arrived at the Gardens at an early hour, and found Mr. Bartlett rather concerned at the occurrence, as from the great hole in the animal's skull he feared untoward consequences—the more so as the loss of such a rare species of Deer would cause a gap in the collection not easily repaired. Having looked at the horn and its firmly adherent osseous piece (I confess, with astonishment), Mr. Bartlett and I proceeded to the enclosure; and there sure enough was the Deer, harmless and timid, but jauntily trotting about as if nothing particular had happened. At once I felt reassured as to a favourable result on learning little or no bleeding had occurred, though I must own the great cavity left looked any thing but promising. Both of us inclined to think that the flies might soon prove a nuisance, and by clustering into the gap or depositing their eggs, cause much irritation, besides producing evil issue and retardation of the healing-process. I suggested the application of tar to the part, first, as excluding air, and, secondly, to keep off the flies. The healing-process proceeded not only satisfactorily, but far beyond expectation, as shall further be related.

Prior to comment, I allude to the keeper's report to our super-

* "Notes upon Three Asiatic Species of Deer," P. Z. S. 1867, p. 835.

† Figures of this identical specimen in different and intermediate stages of horn-growths to that here described will be found in a paper in the forthcoming No. of the 'Transactions,' by Dr. Sclater, pls. xxxvii. & xxxviii.

intendent. He stated that on his opening the door of the inner stall to clean away refuse, the Deer passed quietly out minus its right horn, and that accidentally it tapped its left horn against the door-post, which horn thereupon tumbled off, bone and all, as I now exhibit it. Little or no blood was lost, as I have already mentioned; a slight clot formed, but no serious gush of blood took place.

29th May. Animal apparently going on well; no bad symptoms.

End of June. Daily I had looked at the creature, and things progressed favourably. At this date the right horn had grown as a good knobby projection. The vacuity in the skull had filled up; and indications of the probability of a left horn being developed were apparent, but not very decided.

During July the beam of the right horn had increased considerably; and ere the month had passed the brow-tyne began to shoot forward. By the middle of the month no doubt existed of a horn coming forth on the left side; the bony deficiency was complete; and from the large tuberous mass and velvet covering, a young horn was distinct. Pedicel and a burr were deficient, the horn springing in an indefinite manner from the osseous prominence. The end of July saw a fair-sized horn.

In August considerable growth of both horns took place; the right was higher and far in advance of the left, which was both lower set and irregular as to its division. On August 31st, or three months after the accident, the two horns presented the appearance indicated in the sketch (*A*); viz. the right horn had a considerable-sized backwardly produced tyne, and an equally well-formed up-curved single brow-tyne. The tyne of the left horn was shorter than the right one, and rather expanded terminally; the brow-tyne *was bifid, not single*, the snags each shorter and straighter than on the right side, and with a horizontal direction.

On the 14th September I noted "that since last date the growth of both horns had gone on steadily, the left making good headway." A week after this I made a memorandum that the malformation of the left brow-tyne was becoming more and more marked, by the snags being relatively shorter than on the right side; but the difference of size of left and right beams was less, though they were still unequal.

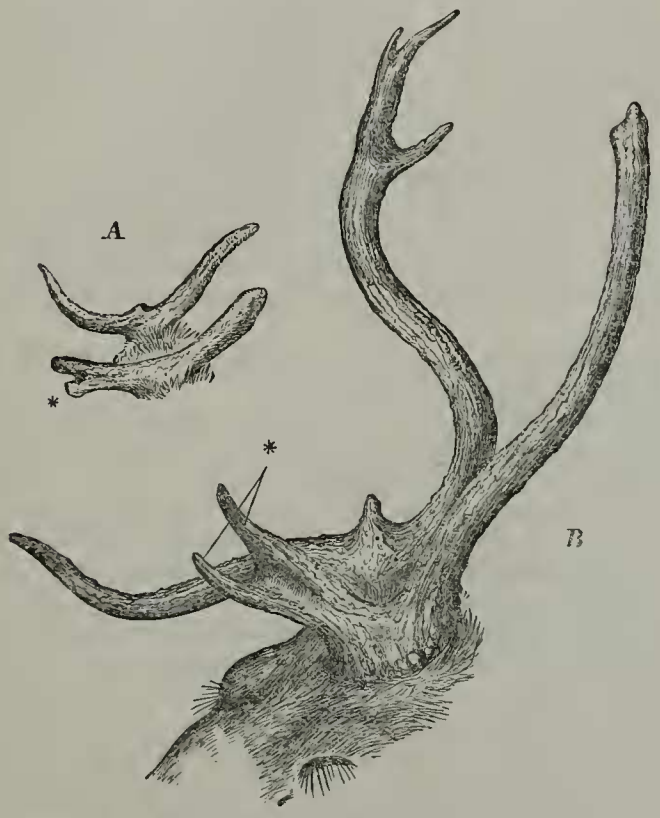
An oily-looking perspiration exuded from both horns.

As winter and spring went on the horns attained each a good size, the malformation of the left, as above described, remaining a notable feature.

The horns thrown off on the above date (28th May, 1868), which I now exhibit, were very much alike, but not quite identical in pattern. They approach Blyth's figure No. 16 (P. Z. S. 1867, p. 840), his Pegu and Munipur variety. There are two short terminal bifid snags, however, on the beam of the right; and what usually is a vertical snag rising from the root of the beam in the left horn, in our specimen comes to the inner side and partially from the root of the brow-tyne. The divisional measurements give $14\frac{1}{2}$ inches of length in the beams, $6\frac{1}{2}$ inches for the brow-tynes, right basal snag 1 inch, and left basal snag $2\frac{1}{2}$ inches.

Attached in a consolidated manner to the left burr is the said osseous or broken-off cranial piece, the dimensions of which are above an inch deep and 2·3 inches in antero-posterior diameter. In the fresh condition the hole left in the skull was indeed a great gap.

Fig. 1.



Horns of *Panolia eldi*, showing different stages of the irregularity of growth.

A. Appearance 31st August, three months after accident. *B*. Horns sketched from the dead body, 1868. The * points to the bifurcated left brow-tyne.

I sawed out a wedge piece of the bone and horn, and found that the line of junction was well defined. A very thin layer of pale-coloured plastic substance intervened, sufficiently thick to admit the blade of a penknife in the middle, but towards the exterior much reduced; in some places the bone and horn-substance were in perfect coalescence, the pale colour and solidity of the latter giving line of demarcation. Neither was diseased; the surface torn from the skull was roughened.

Without premonitory symptoms of illness, the animal suddenly expired on the 13th November, 1868.

I made careful *post-mortem* examination of the body, as it was believed the cranial injury it had received had something to do with

the animal's death; this, however, did not turn out to be the case. The morbid appearances were shortly as follows:—Intense congestion and thinning of the walls of the small intestines, these containing a great amount of flatus. Great intestines perfectly healthy, and loaded with normal fæces. All the other abdominal and the thoracic viscera were quite sound. The brain and the parts around the left horn-base, after careful scrutiny, yielded no appearances of disease or lesion. I considered death to have resulted from acute enteritis.

The woodcut (fig. 1 *B*) represents the renewed antlers at the time of death, the animal then being probably over three years old. The right horn agrees pretty nearly with Blyth's figure (No. 15). The left has a more erect beam, and with only rudiments of terminal snags; the brow-tyne is represented by two subequal snags. There is no distinct burr, this horn rising with a large base close to the skull. Length of right beam $26\frac{3}{4}$, and of left 21 inches. Right brow-tyne $12\frac{1}{2}$ long. Inner snag of left brow-antler $6\frac{1}{4}$ inches, tip inwardly curved; outer snag $5\frac{3}{4}$ inches, and with a slight outward sweep.

Remarks.—It appears to me a few legitimate deductions may be drawn from the case I have just related.

1. It proves that the pedicel of a Deer's horns and portion of the cranial bones when torn away *at the period of shedding* are not only repaired by a fresh irregular osseous mass, but redevelope thereupon a new horn. From the experience of others, I understand it would be doubtful, if horns were in an active growing state and such an accident were to happen, whether they would be renewed again.

2. But a minimum of blood was lost—showing that not only the vessels to the horn itself but also those of the forehead must have been in a contracted condition; else greater hæmorrhage would have resulted.

3. That in this Panolian Deer the horn of succession was malformed, the deviation consisting in an extra development of snag and alteration in direction—this abnormality, when uniform on both sides, (within certain limits) being considered by some naturalists of specific value. By such a character and nodulation of the superficies Dr. Gray separates his *Panolia platyceros* from his *P. acuticornis* = *P. eldi*.

4. That variation of the reproduced horn was probably coordinate with, or in fact due to, fissive growth of the blood-vessels. Hence it follows that a slightly altered blood supply produces corneous variability, this by inheritance producing the so-called varieties and ultimate species—*i. e.* where animals are specifically subdivided by form of horns, as notoriously is the case among Deer.

5. This multiple reproduction of hornlets is possibly correlated with similar multifission of the tail of Batrachians and Fishes, which, as experiment has often shown, produce a double tail on the caudal appendage being severed.

9. Catalogue of the Mammals of China (south of the River Yangtsze) and of the Island of Formosa. By Robert Swinhoe, F.Z.S.

Primates.

1. Hylobates, sp. (Gibbon.)

A species of black Gibbon is said by the Chinese to exist in the country west of Canton. It may be the same as the animal found in Hainan, which I have attempted to identify with the *H. pileatus*, Gray (see *anteà*, p. 224). The British Museum has a young specimen of *Presbytes maurus* (Schreber), and an adult *Silenus veter* (Linn.), both presented by Mr. John Reeves, who brought them with him from China (see List of Mamm. Brit. Mus. 1843). But it is very doubtful indeed whether either of these species occurs within our limits; they were probably procured at Canton, whither merchant ships or junks had brought them. The evidence is not sufficient to justify our admitting them into the Chinese list of mammals. Friends who have travelled through forests in the mountains of the Fokien province have informed me that they have seen troops of monkeys in some places; but I have never had the good fortune to meet with any of these tree-monkeys.

2. Macacus sancti-johannis. (St. John's Monkey.)

Inuus sancti-johannis, Swinh. P. Z. S. 1866, p. 556.

This rock-monkey is found on most of the small islands about Hongkong, and is like a Rhesus with a very short tail. The young specimen taken alive by Commander St. John, R.N., on North Lena Island, did not live to maturity in the Gardens of the Society; and therefore it was not determined at home whether the species is really a valid one. Dried bodies of this animal split in two are often exhibited, hanging from the ceiling, in druggists' shops, in Canton and Hongkong; and its bones are used for medicinal purposes. Its closest ally is the Pig-tailed Monkey (*Macacus nemestrinus*, Is. Geoffr.) of Tenasserim; but it seems to me to be a distinct race.

3. Macacus cyclopis. (Formosan Rock-monkey.)

Macacus cyclopis, Swinh. P. Z. S. 1862, p. 350, pl. xlii.; 1864, p. 380; Sclater, P. Z. S. 1864, p. 711 (woodcut).

The specimens that were living in the Society's Gardens have died, and are now mounted in the British Museum. These adults are strongly tinged on the upper parts with olive-green, freckled with darker colour.

The Rock-monkey of Hainan appears to be the ordinary *Macacus erythræus*. (See *anteà*, p. 226.)

4. Nycticebus tardigradus (Linn.). (Slow-paced Lemur.)

Has been brought alive from Canton, and presented to this Society

(P. Z. S. 1863, p. 375); is called in Chinese *Me-shuy*, and said to come from the south-west part of Kwangtung Province.

Chiroptera.

The Bats I procured during my last residence in China I submitted to Prof. W. Peters of Berlin, who has kindly supplied me with the names of those known, and with descriptions of the new species. In the following list Dr. Peters's notes are placed within inverted commas.

5. "Cynonycteris amplexicaudata, Geoffroy." (Flying Fox.)

A female of this frugivorous Bat was brought to me at Amoy in May 1866. It was dead, but had a live young one still fastened to its breast. The young animal was more than a third the size of the mother, covered with soft fine hair on the upper parts, and nearly naked below; its colour was brown, like that of its parent, but did not show the nuchal band. I never saw but these two specimens.

6. Megaderma lyra, Geoffr. (Lyre-nosed Bat.)

A pair of this fine species were captured in an outhouse at Amoy. I have seen them of a summer's evening flying very high over the town of Amoy.

7. "Phyllorhina aurita, Tomes;" P. Z. S. 1859, p. 76. (Large-eared Leaf-nose.)

This Large-eared Leaf-nose is common at Amoy in May; and I have a good series of them. A smaller short-eared species I procured two of in the celebrated cave at Kelung (N. Formosa), and sent home in spirits (P. Z. S. 1864, p. 381).

8. "Phyllorhina swinhoii, Peters, n. sp." (Swinhoe's Leaf-nose.) = Ph. armigera, Hodgs.

"Ph. *maxima, auriculis acuminatis, apertura frontali parva, prosthemate ferro-equino multo angustiore, foveis quatuor insigni; cauda crure longiore; supra fusca vel fuliginosa, collo gastræoque pallidioribus.*

"This species is of the same size as, or still larger than *Ph. diadema*, Geoffr. (=*Ph. insignis*, Horsf.), but easily to be distinguished by the form of its upper nose-leaf, which is much narrower than the horseshoe and the middle nose-leaf.

	millims.
"Antibrachium	84–90
Tibia	30–36
Foot	20"

A large number of these were taken in summer in a cave near Amoy.

9. "Miniopterus blepotis, Temminck;" Tomes, P. Z. S. 1858, p. 121. (Red-and-black Bat.)

A very abundant species in summer at Amoy, found in numbers

hidden in caverns. The females and young are reddish-brown, the adult males black.

10. "Vespertilio fimbriatus, Peters, n. sp." (Fringed Bat.)

"Closely allied to *V. emarginatus*, Geoffr. Ears rather more emarginate and more pointed; tragus straight and shorter; wings extending to the middle of the metatarsus; margins of interfemoral and lumbar membranes ciliated.

"Third lower incisor horizontally half as long as the canine. Upper canine and third premolar closer together than in *V. emarginatus* or *V. daubentonii*, the second small premolar being situated at the inner side of the third.

"Above light brown, below ash-coloured, all the hair at the base slate-coloured.

	millims.
"Total length about	85
Head	18
Total length of ear	15
Anterior margin of ear	13
Tragus	7
Forearm	39
Tibia	16–17
Foot	11–12"

A common species at Amoy. Several examples procured; some are plain brown on the upper parts, others rufescent brown.

11. "Vespertilio laniger, Peters, n. sp." (Woolly-faced Bat.)

"Ears, tragus, and face very similar to those of *V. mystacinus*; wings extending to the middle of metatarsus; point of tail exserted.

"Teeth similar to those of the same species, third lower incisor larger, and lower canines with much shorter points.

"Above dark brown, beneath greyish white. The greater basal part of the hair slate-coloured.

	millims.
"Total length about	80
Head	18
Ear	13
Tragus	6
Forearm	35
Tibia	16
Foot	10"

This little woolly Bat is comparatively rare at Amoy; I only procured three specimens.

12. Vespertilio rufo-niger. (Black-and-Orange Bat.)

Vespertilio rufo-niger, Tomes, P. Z. S. 1858, p. 85, pl. lx.

This Bat was described (*l. c.*) by Mr. Tomes from a specimen procured by Mr. Fortune at Shanghai. I have seen it at Tamsuy, N.W. Formosa (see P. Z. S. 1864, p. 381, *Pteropus*?). At Takow (S.W. Formosa) I procured a specimen, a note on the habits of which will

be found in P. Z. S. 1862, p. 356 (species allied to *Kerivoula formosa*).

At Takow, where Bats are very scarce, I was walking on the 5th July, 1865, under a grove of trees. One tree had large leaves and lilac-like flowers. Close to a bunch of flowers, between some big leaves, I observed a cluster of some roundish things which I took at first for fruit or some kind of gall-nuts. One of the clusters moved, and I saw that they were the heads of Bats. They were hanging head downwards from the stem of a leaf in a bunch one against the other, their heads only showing, their bodies being hidden by the leaves. There were about ten of both sexes,—one female with a young one at her breast, and her breasts much swollen. Their colour was light yellow, the wings being variegated with orange and brown. I procured several specimens, and sent them to England. Some of them came into Prof. Peters's possession; and he has identified the species as that described by Mr. Tomes. But surely the habits of this species would show that it is not a typical *Vespertilio*!

13. VESPERTILIO CHINENSIS, Tomes, P. Z. S. 1857, p. 53.

Brought from South China by Mr. Fortune.

"VESPERTILIO DAVIDII, Peters." (David's Bat.)

Dr. Peters had this species for examination from the Museum at Paris. It was sent home by Père David. It has not yet occurred in South China, and therefore I do not number it.

14. "VESPERUGO ABRAMUS (*et* AKAKOMULI), Temminck." (Chinese House-bat.)

The female is a rich brown, with lighter and dusky underparts; the male is black. I procured the former in Hainan, and the latter in Canton. They were common in the settlement at Canton of an evening in April.

15. "VESPERUGO PIPISTRELLUS, Daub.?" (Small House-bat.)

Dr. Peters marks my specimen from Formosa with a query. This is a very common species at Taiwan (capital of Formosa), and thousands may be found clustered together in the old Dutch fort within the walls of the city. I have no specimen from South China; but it doubtless must occur there also.

16. "VESPERUGO IMBRICATUS, Temminck." (Imbricated House-bat.)

A common species at Amoy.

17. "VESPERUGO PULVERATUS, Peters, n. sp." (Grizzled House-bat.)

"In form of ear and tragus similar to *V. maurus* of Europe, but the tragus apparently not double-toothed. Wings extending to the

base of the toes; point of tail exserted. Base of interfemoral membrane very sparingly furnished with hair.

"Form of teeth similar to those of *V. pipistrellus*, the first upper premolar being much larger than in *V. maurus*.

"Hair black, on the upperside with very short, beneath with longer brownish-grey tips.

	millims.
"Total length about	85
Head	18
Ear	12·5
Tragus	55
Forearm	34
Tibia	13
Foot	8"

I have specimens from Amoy taken in August and September. It is not a common species.

18. "VESPERUGO MOLOSSUS, Temminck." (Molossus Bat.)

Dr. Peters has this species from Hongkong.

"VESPERUS SEROTINUS, Schreber." (Evening Bat.)

A very common species in summer evenings about the city of Peking. I do not number it, as I do not know of its occurrence in South China.

19. SCOTOPHILUS PUMILOIDES, Tomes, P. Z S. 1857, p. 52.

Brought from South China.

20. "SCOTOPHILUS HEATHII, Horsfield." (Heath's Bat.)

About five inches in length, with snuff-brown upper and snuff-yellow underparts; very common in Canton in April and May, flying about in large numbers over the Foreign Settlement.

21. "SCOTOPHILUS TEMMINCKII, Horsfield." (Temminck's Bat.)

Smaller than the last, brown above, much paler below; occurred in numbers in company with the last, in the same place.

22. DYSOPES (MOLOSSUS) RUEPPELII. (Large-eared Tailed Bat?)

Dysopes (*Molossus*) *rüppelii*, Temm. Monogr. de Mammalogie, i. pl. xviii.

I procured a specimen of a Bat some years ago at Amoy which greatly resembled Temminck's figure, though it could hardly be the same as that species, which is from Egypt. My specimen was sent to England, and, I believe, is now in the collection of Mr. R. Tomes. Somes notes will be found on its peculiarities in P. Z. S. 1862, p. 11. The animal I speak of was brought to me alive on the 25th Nov. 1859. It was an adult male, and measured from snout to root of tail 4·3 inches; tail 1·2; expanse 15·5; ears 1·1, protruding beyond snout; breadth across the ears 2. Its skin was

soft and mole-like, of a deep brown, with a madder-tint, lighter on the underparts. The membrane extending from the tail to the legs was wrinkled, and covered the tail like a glove, so as to slip up or down as the creature wished to expand or contract its interfemoral wing, or, in nautical language, to shake out or take in reefs. The toes on each hind foot were five in number, of nearly equal length, the outer one thicker, all with longish pale hairs, chiefly at their tips; sides of the upper lip and upper surface of ear furrowed or grooved. Eyes small, and nearly hidden in the recess formed by the protruding ears. The living animal carried two species of parasites, one winged and the other wingless. These have been described and figured by Mr. H. Giglioli, in the 'Proceedings of the Microscopical Society' for 1863, as *Strebla molossa* and *Polyctenes molossus*.

I have often, on a cloudless evening, at Amoy, seen these Bats flying along high in the air, being easily distinguished by the narrowness of their wings. When irritated, the creature has a habit of exposing its tail by the process above described, and of sinking its eye into the socket, and thrusting it out again.

Insectivora.

23. Talpa insularis. (Formosan Blind Mole.)

Talpa insularis, Swinhoe, P. Z. S. 1862, p. 10.

Found in the hills of the north end of Formosa. A Mole occurs about Peking which M. Alphonse M.-Edwards has distinguished as the *Scaptochirus davidianus* (Annales des Sciences Nat. 5e série, t. 7), *anteà*, p. 450.

24. Talpa, sp.

I have a Mole from Foochow, China, which resembles the Szechuen species; but, owing to the present troubled state of Paris, I have not been able to compare it.

25. Sorex murinus, Linn. (Musk-rat.)

Sorex myosurus, Pall.
S. swinhoei, Blyth, J. A. S. xxviii. 285.
S. albinus, Blyth. J. A. S. xxix. 90 (the young).

The Common "Musk-rat" is found throughout China, Formosa, and Hainan, in houses in large towns. Has an unpleasant musky odour, and a peculiar chatter, like the chinking of money (Swinh. 'Zoologist,' 1858, p. 6224; P. Z. S. 1864, p. 382; P. Z. S. 1870, p. 231).

26. Sorex ——? (Small Shrew.)

Sorex ——?, Swinhoe, P. Z. S. 1864, p. 382.

The two little Shrews I took under decayed dung on a hill at Tamsuy, Formosa, and mentioned before (*l. c.*), I sent in spirits to Paris, but do not at all know what has since become of them.

27. Erinaceus ——? (Hedgehog.)

I have heard of Hedgehogs occurring at Taiwan (Formosa), at Amoy (P. Z. S. 1864, p. 378), and in Hainan (*anteà*, p. 237), but I have never been so fortunate as to procure a specimen from any of these localities. They are common about Peking; and I have lately brought to the notice of this Society the Peking species, and proposed to name it *E. dealbatus* (*anteà*, p. 450).

Carnivora.

28. Ursus tibetanus, F. Cuvier. (Black Bear.)

Helarctos tibetanus, Swinhoe, P. Z. S. 1862, p. 351.
Ursus formosanus, Swinh. P. Z. S. 1864, p. 380.

The Tibetan Black Bear is found in the mountains of the Shantung promontory; and I procured thence a living specimen, which is now in the Gardens of the Society. But the Black Bear of Formosa I long suspected to be distinct; and a young animal I procured at Taiwan seemed to confirm my view. It had the face as black as the rest of the body, instead of brown as in the individual from Chefoo. The animal from Taiwan also reached England alive, and may be now seen alongside of the other black Bears. Mr. Bartlett tells me he can see no distinction between it and the true Tibetan form. At Taiwan I obtained two flat skins of the Formosan Bear in the adult state; and these would show that the animal attains a very large size, fully equal to the biggest specimens from the Himalayas; but my skins exhibit, in addition to the crescentic white patch on the breast, a large round white spot on the belly. This Mr. Bartlett tells me he has also seen in the Bears from India. I procured a good series of the skull of our Bear from the aboriginal tribes of the central mountains, who dedicate them to the Great Spirit of the Chase; and in these I cannot find any noticeable difference from the skulls of the Himalayan species in the British Museum. We must allow, then, that the Formosan Black Bear is simply the Tibetan Bear, which appears also to occur in Hainan, and probably throughout the mountains of China generally. I extract a note on the Formosan Bear from the 'Taiwanfoo Gazetteer':—"Bears have hair stiff as bristles, and their coat is thick and shaggy; the arrow's head cannot pierce the body. Their feet are strong, and with their claws they can climb trees, on the summits of which they will sit cross-legged, or they will burrow into the earth and dwell there. People capture them by stratagem. Before they have carried young their bellies contain much suet that is eatable; their paws, however, are the tit-bits (lit. the one of eight pearls). Hashed and roasted, these afford a true relish; but it is no very easy matter to cook them properly."

Brown Bears, or "Men Bears," as the Chinese call them, are said by the natives to occur in the mountains of South China; but I have never seen any. In North China, I have been informed by friends, Brown Bears are taken about by showmen, and made to dance and

do various tricks at fairs. These will probably be of the species aequired by the Society in 1867, and figured in woodcut as *Ursus piscator*, Pucheran (P. Z. S. 1867, p. 817).

29. Meles leptorhynchus, Alph. M.-Edwards. (Chinese Badger.)

M. chinensis, Gray, P. Z. S. 1868, p. 207 (figures of skull).

Of this species "the skull," remarks Dr. J. E. Gray, "is so like that of *Meles leucurus* from Thibet that I should have regarded them as the same, if there were not so much difference in the length, and flaccidness and coloration of the fur, and the abundance of the under-fur. This may depend on the climate. The shortness and peculiar colour of the fur are exactly alike in the specimens sent by Dr. Harland from Hongkong, and by Mr. Consul Swinhoe from Amoy. I may observe that when Dr. Harland's specimen was sent it was regarded as a young *Arctonyx collaris*." (Cat. Mamm. 1869, p. 127.)

The first of this species was brought to me at Amoy on the 17th July, 1867, in so badly wounded a state that it soon died. It was a male, and measured from the snout to the root of the tail 22 inches: tail 6; from carpal joint of fore leg to tips of claws 4·75; from shoulder to carpal joint 8·25; sole of fore foot 2·2 long, 1·1 broad, longest claw ·6; hind foot 2·8. Length of head 5·1; tip of nose to corner of eye 1·7; from ear to ear across head 2·45; breadth of ear 1·5; edge of upper lip to base of projecting nose ·75.

Hair of upper body coarse, about 1·5 inch long. Nose and nails brownish flesh-colour. Soles of feet pale flesh-colour. Band under nose brown, with a narrow side border of same to lower lip. A band of black about an inch wide runs along either side of the head, from near the snout across the eyes, and terminates broader just behind the ear. A broad stripe of buff-white runs from the nose to the occiput, and another of the same colour on either side of the face (including angle of mouth, with a narrow strip round chin) to below and beyond the ear; ear black, with a buff-white border to its upper half. Underparts and limbs black; upper parts somewhat densely clothed with short pale buff woolly under-fur; the upper-fur long and coarse, and also pale buff with dark centres, giving a grizzly appearance to the coat. Tail plain light buff. Teeth somewhat worn. The fur had many lice, but I only detected one flea.

On the 19th July a male and female were brought to me, the latter very large and very old, with few teeth remaining, and these quite worn down. They were both fresh killed. The female had four teats on the belly, and two on the abdomen, just between the fore part of the thighs. She measured 31·5 inches, with a tail of 7·25 to its bony tip, and hairs extending 2·25 beyond; between ears across head 2·75. Her hair was much longer, especially on the tail; and she was much more tawny on the upper parts. Neither of them had the black and white face-markings so distinct as in the younger animal of the 18th June.

Later on in the summer I procured several more, and noticed that in some the white central face-streak gets almost obliterated by being smeared with black.

In the hills of the Tinggan District, near Amoy, these animals appear to be common. They lie torpid in their holes during winter, but in summer come down to the fields of sweet potatoes, which they root up and eat. The natives call them "Sweet-potatoe Pigs," and lie in wait to shoot them with matchlocks. The flesh is not esteemed by the Chinese, and only the poorest classes eat it.

Our South-China animal, as M. Alphonse M.-Edwards has lately shown me, is of the same species as that sent to Paris by Père A. David from the neighbourhood of Pekin. This Badger, therefore, must have an extensive range. A second species also occurs near Pekin, the *Meles leucolæmus* of A. M.-Edwards. *M. ankuma*, Temm. & Schleg., is from Nagasaki (South Japan). In Formosa I noted no Badger.

30. Helictis moschata. (Musky Tree-civet.)

Helictis moschata, Gray, P. Z. S. ii. p. 94 ; 1865, p. 153 ; Cat. Mamm. 1869, p. 142.

Mr. Reeves originally brought this animal from Canton. I have got it from the neighbourhood of Amoy, and lately found it offered in the market at Shanghai. The Shangai specimens are more tinged with orange-yellow on the underparts, and in colouring come near the Formosan species.

31. Helictis subaurantiaca. (Orange-tinted Tree-civet.)

Helictis subaurantiaca, Swinhoe, P. Z. S. 1862, p. 355, pl. lxiv. ; Gray, P. Z. S. 1865, p. 153 ; Cat. Mammals, 1869, p. 142.

This species is found throughout the wooded hills of Formosa, but in the north end of the island it attains its richest colouring. In the south, near Takow, a specimen was brought to me quite pale, and scarcely differing in outward appearance from the former species.

Dr. J. E. Gray has pointed out (*l. c.*) the chief characteristics that distinguish this from its Chinese and Nepaulese allies.

32. Martes flavigula (Bodd.), var. xanthospila. (Yellow-necked Marten.)

This fine Marten was procured by my hunter in the forests of the central mountains of Formosa. It differs from Himalayan specimens in the British Museum in having the dark colour of the head less extended on the hind neck, and grizzled with white on the occiput, and in having the sides of the neck bright golden yellow. The skull is unfortunately within the skin, and so is not handy for comparison. Head purplish brown, grizzled with white on the occiput. Behind ear and backwards a long broad spot of purplish black. Chin, upper lips, and in a line backwards to lower edge of ear, throat, central streak of chest, and a stripe between the hind legs white. Sides of neck rich golden yellow. Fore part of back and fore

quarters light brown washed with golden. Body above and below light purplish brown, becoming nearly black on hind quarters, hind legs, and tail. The fore legs are deep purplish brown, paler on the front; claws whitish. The brown of the head ends abruptly backwards, with a transverse golden line edging it. Length from snout to root of tail 20 inches; tail 14·5, with 2 inches of hair beyond. Length of head 4·25; greatest breadth 2; breadth between ears 1·75. Hind foot from tarsal joint 3·50; sole-pads small; claws short, deep, and well-curved.

I only procured the single specimen in Formosa, and have never heard of its occurrence in South China; but as the Indian animal is, according to Dr. Jerdon, very widely spread in Hindostan and its archipelago (Mamm. of Ind. p. 82), this Marten is likely enough to be found in suitable localities in China also.

33. Mustela sibirica (Pall.). (Red House-stoat.)

Vison sibirica, Gray, P. Z. S. 1865, p. 117; Swinhoe, Zoologist, 1858, p. 6223.

Lives in the walls of houses in most of the towns in China, and feeds on Rats and Snakes. I have seen them in Tientsin, Amoy, and Formosa, and have heard of them in most places that I have visited in China (see *antea*, p. 238).

The following note was made on a fresh male specimen at Amoy, about two-thirds grown:—

Length of head 3·2 inches, from its junction with neck to root of tail 10·5; tail 9·75 (including 1·2 of hair at tip). Height of ear 1·25; depth of head near ears 1·75; breadth between ears ·75, between eyes ·7; greatest breadth of head 1·75, of nose ·4, of eye ·4; from rictus to tip of nose 1·2, to end of lower lip ·75.

Hair of a uniform light chestnut throughout, with paler underfur, slightly tinged with grey. Chin and round nose white, with some white on the under neck. Face in front of eyes blackish brown, with a little brown on the crown. Moustache-hairs brown. Claws light brown colour.

34. Lutra chinensis. (Chinese Otter.)

Lutra chinensis, Gray, Loudon's Mag. Nat. Hist. 1836, p. 580; P. Z. S. 1865, p. 126; Swinhoe, Zoologist, 1858, p. 6224; P. Z. S. 1861, p. 390; 1864, p. 381.

Found all over South China; frequents the sea-coasts as well as inland waters. On the 27th January, 1867, some fishermen brought me a fine male that had crept into their boat to steal the fish. It was dead, but still warm. I took down the following notes of its appearance:—

From snout to root of tail 25 inches; tail 16·5, in girth at base 6 inches, tapering to a point, with about ·4 length of hair beyond tip, making a complete point. Ears small and rounded; breadth between them across head 3·25; length of head 5·25; breadth between outer angles of eyes 1·3, between inner angles 2; eye in dia-

meter ·5 ; breadth of muzzle 2·2. Length of fore leg from shoulder to tip of claws 7·75 ; of hind leg from hip to tip of claws 9·5. Girth of neck 10·25, of body 13.

Throat, under neck, and round upper jaw white, with light buff under-fur. Sides of head and neck between fore legs and on their underside whitish with brownish under-fur. Breast and belly brownish white, with deep buff-brown under-fur. Upper parts, tail, between hind legs, and anal region deep glossy brown. Fore feet with light yellowish buff on the three central toes ; nails flesh-colour. Nose black ; irides dark ; lips flesh-red, washed with black ; teeth white. Feet beneath brownish flesh-colour, with blackish-brown pads.

In the Ichang Gorge, 1110 miles up the river Yangtsze, we came across a fisherman with a trained Otter. It was very tame and gentle, but he kept it chained in his boat. To make use of its services he would throw his large loose net, weighted at the edges, and let the Otter into the water fastened by a long string: the Otter would swim and dive round the outer edge of the net, driving the fish under the net, which gradually contracted its edges until it was drawn up. The fisherman would then call the Otter, giving him a jerk or two, and it quietly returned to its corner in the boat. The Otter appears also to be used in India for a similar purpose (Jerdon, Mamm. of India, p. 87).

35. Lutra swinhoei. (Swinhoe's Otter.)

Lutra swinhoei, Gray, P. Z. S. 1867, p. 182.

Dr. J. E. Gray has founded this species on the skull taken out of the skin of a young Otter from Amoy (not Formosa as stated), which I sent home, in company with a larger one from the same place. Dr. Gray observes (*l. c*) that the skull in question "has a very large square tubercular grinder, and a very large rounded internal lobe to the flesh-tooth, as in the second section," which he has called *Lutrogale*. He adds that the species "is easily characterized by the small size of the upper cutting-teeth, the series forming only a width of 4½ lines; while the series of most other Indian Otters occupy 6 lines (or half an inch), or sometimes rather more." The specimen that was sent to Dr. Gray I had alive at Amoy on the 27th August, 1859. It had been captured at Gawkang, an island close to Amoy. I judged it to be about four months old. It was very gentle, and followed me about like a dog ; it delighted in rolling about the floor scratching and biting itself, or would sleep rolled up on the door-mat. When left alone it would utter loud cries like that of a young chicken in distress, and when hungry a long series of sharp jarring notes. It measured 21 inches, less tail 8 ; length of head 4, breadth of head 2·5, across lips 1·7, height of head 2 ; breadth of eye ·4, of nose ·6. Fore leg 3·5, across expanded foot 1·3 ; hind leg 3, across hind foot 2. Upper parts rich dark brown ; under parts yellowish brown, nearly white on the tips, cheeks, throat, and fore neck. Ears small, and nearly concealed. Feet well palmated, with bare pinkish-brown soles and short white nails. Lower bristles over the lips white, the upper brown.

A species of *Aonyx*, or clawless Otter, is found in Hainan (see *anteà*, p. 229); but none of this group has turned up either in South China or Formosa. *Lutronectes whiteleyi*, Gray, P. Z. S. 1867, p. 181, is a long-tailed species from Hakodadi, North Japan.

36. Felis tigris. (Bengal Tiger.)

Felis tigris, Linn.
Tigris regalis, Gray, P. Z. S. 1867, p. 263.

Tiger-skins are always purchasable at the fur-shops in Canton; and, from their moderate cost, there is no reason to disbelieve the statements of the dealers, who affirm that they are procured on the hills to the westward of that city. In 1858 several made their appearance on the bare hills of the country near Amoy, and committed much depredation on the live stock of the farms, and in some instances killed and injured the natives. One of these animals swam across to Amoy on the 2nd of February, and appeared in the early morning squatting, cold and exhausted, outside a temple in the lower part of the town, or suburb of Ey-mun-kang. It was hunted into a house and locked in. The roof was then partly uncovered, and some soldiers were called to dispatch it with matchlocks. This they did by firing down through the roof. The dead beast was suspended to a bamboo pole, and carried by four men in triumph through the town. I had it brought into my courtyard and examined it. It was a male, and measured from the snout to the root of tail 64 inches, tail 30; fore leg from shoulder 33; circumference of foot 13, footpad 4; length of head 14, depth of head 9, circumference of head 29; space between ears 9; length of ear 5·5; length of upper canine tooth 2; circumference of body round thorax 40; hind leg 33; circumference of foot 12. Circumference of hind body (round abdomen) 35; round humerus 18, round femur 19, circumference of tail 9·25. It weighed 330 lbs. The skin of this animal was presented to the temple in front of which the poor beast in life was first sighted, and was afterwards used as a carpet for the chief idol on the shrine. The bones were purchased for medicinal purposes by the Taotai, or Governor of Amoy; and its flesh was sold in the streets at 4*s*. a pound as a preservative against smallpox. Its stomach was empty.

On the 11th November of the same year I chanced to meet a Tiger myself. I was on the shore of the mainland opposite Amoy in the afternoon looking out for small birds, in company with a friend. I carried a gun, but had only small shot and one cartridge. Some villagers came running to us crying "Go and shoot the Tiger." I thought they were making game of us, until some of them assured us that there really was a Tiger in a neighbouring village, and that they would be much obliged if we would kill it. They led us to a village at the foot of a hill near the shore, where we found men, women, and children huddled outside in great alarm, many of the men armed with matchlocks. They desired us to take off our boots, and one of the men guided us over the roofs of the houses to the last house near the hill, and, pointing to a large rock, he bade us listen. We

could distinctly hear growls, and peering over I saw the lips and feet of a tiger under the overhanging rock. The house on which we stood presented a wall facing the rock, and about two yards distant. We went inside, and I persuaded the owner to make a hole in the wall. I had no means of drawing the charge of my gun, so rammed down a cartridge on the top of the small shot in one barrel, and a few hollow buttons into the other. In the hurry and excitement, no bullets or iron nails were forthcoming. The Tiger noticed the hole in the wall, but only growled. I fired the button-barrel first, aimed at its neck, but he only answered by a growl, and I saw that the buttons had done no more than turn up the skin, without penetrating. His face was full towards me, and I gave him the cartridge right between the eyes. He gave a furious roar, and bounded into the garden, where he stood for a few seconds bleeding from the nose, and with his tongue lolling from his mouth. I had no more cartridges with me, so I loaded again with the hollow caged buttons which the villagers tore off their coats for me. The Tiger had moved away, and I tracked him by his blood into a dilapidated temple. I looked in at the window, and there stretched beside a coffin sat the noble beast. He turned his head and growled as he saw me; and, without a moment's thought, I raised the barrels and fired another shower of buttons at his face. I turned and fled; but a roar followed which I never shall forget, and I found myself, breathless, at the bottom of a precipice, with my gun upraised, expecting to see the angry creature upon me; but, strange enough, he did not follow. The villagers, who were assembled two hundred yards away, all ran when I ran; but seeing the Tiger did not pursue, one of them came forward and put me on his knees, and patting me on the back, helped to bring back my breath, which I had lost by the fall. We crept up to the window again. Every one of the thick wooden bars had been knocked out by the force of the leap; but from the blood only splashing the outside of the window, it was evident the Tiger had not come out of the building. We looked in at the window, and just below, outstretched on the floor in a pool of blood, lay the Tiger. I threw up my hat, and shouted to my friend, who watched the proceedings at a distance, that the Tiger was dead. At the noise the Tiger raised his head and growled. He was a Cat, of course, and had the usual nine lives. I went to the villagers, and proposed a joint attack, but they would not consent. Some of them ascended the hill behind, and fired on to the roof of the house in which the Tiger was sheltered. It was getting dark, so, breathless and hurt, I took boat and returned to Amoy. A few hours after the Tiger is said to have moved away; but whether he died or survived his wounds, I could never satisfactorily learn, so contradictory were the stories told.

In 1859 and 1860 Tiger-cubs were offered in the market at Amoy for sale, and one of them was kept alive by a friend for many months. It eventually died, and I exhibited its skin before this Society on the 23rd of June, 1863*, comparing it with a skin of a Tiger from India of about the same age. It differed a little in the markings of

* See P. Z. S. 1863, p. 237.

its rump and tail, but not more than might be attributable to individual variation.

At Foochow and Ningpo Tigers have also shown themselves in the surrounding country, and the animal is well known to the natives throughout China as the Lao-hoo.

The Tiger in the north of China grows to a very large size, seven to eight feet from snout to tail, and is clothed with much longer and denser hair. Skins of this northern race are brought to the port of Newchwang from Mantchuria. I exhibited one of them at the meeting of this Society on the 13th of January, 1870, and pointed out its peculiarities (see *anteà*, p. 3). This skin is now in the British Museum; but it will be necessary to procure a skull to determine whether there really is sufficient difference to justify separating the Tiger of the snows from the Tiger of the tropics.

37. Felis pardus (Linn.) (Leopard.)

Leopardus pardus, Gray, P. Z. S. 1867, p. 263.

Found in various parts of South China. Judging from skins procured at Canton, the Chinese race is of a much richer yellow colour, and has the spots larger and blacker than is usually seen in skins from India.

Leopardus japonensis, Gray, P. Z. S. 1862, p. 262 (*L. chinensis*, Gray, P. Z. S. 1867, p. 264), is the representative form in North China and Mantchuria (see *anteà*, p. 4).

38. Felis macrocelis (Temminck). (Clouded Tiger.)

Neofelis macrocelis, Gray, P. Z. S. 1867, p. 265.
Leopardus brachyurus, Swinhoe, P. Z. S. 1862. p. 352.

The acquisition of a skull and a properly stuffed animal during my last sojourn in Formosa satisfactorily proves that the insular form of "Clouded Tiger" is merely a small race of that of the Continent. My specimen was a male, and measured from the snout to the root of the tail 28 inches, tail 23. Its head is small, and its feet large. It is of a rich buff ochre colour, with deep-black spots and markings. Underparts nearly white, with large brownish-black markings.

A large flat skin of a female, brought at the same time, was of a paler and yellower tinge; and that of a younger animal was brighter still, with a green wash over the yellow, the fur being longer and shaggier than in the two adults.

39. Felis viverrina, Bennett. (Asiatic Wild Cat.)

Viverriceps bennettii, Gray, P. Z. S. 1867, p. 268, fig. 5 (skull); Swinhoe, P. Z. S. 1862, p. 7.

The flat skin I brought home from Formosa in 1862 was identified with this species. I have not since succeeded in getting an entire animal; so it is not certain whether ours is the same as the Himalayan species. Flat skins like the Formosan are also procurable in shops in South China.

40. Felis chinensis. (Chinese Tiger-cat.)

Felis chinensis, Gray, Mag. Nat. Hist. vol. i. p. 577 (1837); P. Z. S. 1867, pp. 274, 400.

Leopardus reevesii, Gray, List of Mamm. Brit. Mus. 1843, p. 44.

Felis javensis, Sel. Cat. of Vert. p. 22 (1866).

This little Tiger-cat is the commonest wild cat in Formosa and South China. I procured a good skin and skull of an adult and of a young one in Formosa, and sent thence to the Society a living example in 1866, which, however, unfortunately died in the Gardens soon after landing. I have also flat skins of it from the Fokien hills and from Shanghai. The British Museum has specimens brought from Canton by Mr. J. R. Reeves many years ago. It is a forest species, and is extremely wild and irritable in confinement.

The skull of the Formosan adult female is of a long oval form, measuring in length 3·4 inches, breadth across malar arches 2·25, breadth behind orbital spine 1·1; greatest breadth of brain-case, below, 1·4; orbits imperfect.

Head brownish grey, with more or less rust-colour; a line over and under the eye, a patch on each side of nose, cheeks, and chin pure white. From the white line over the eye runs a black line on each side over the crown and down the back of the neck; between these are two other longitudinal black lines, with an indistinct short one between them; the muzzle is spotted with black, surrounded by rusty chestnut, and an irregular line of the same runs from the posterior angle of the eye to under the ears, breaking into spots; another runs along the cheek, a third shorter one further down, and a fourth like a long spot on each side of the throat. Moustache-bristles brown and white. Ear pale in front, black behind, with a white spot. A black streak of grey marks each side of the hind neck. Underparts, inner surface of fore legs and of thighs, white, with large brownish-black oval spots. Upper parts brownish grey, washed between the shoulders, and less richly along the back, with chestnut-brown; shoulders spotted and marked with rich deep chestnut-brown, with streaks between them of the same colour mixed with black; further along the back the streaks break up into long oval or oblong black spots. The spots on the sides of the body and on the legs are browner. Fur short and somewhat soft; under-fur dusky grey. Fore feet light yellowish brown, speckled on the outer surface with chestnut; under foot dusky. Hind feet the same, without spots. Tail with longer and woollier hair than the body, more dully coloured, with large spots of dingy brown.

Head long and narrow, about 4·25 inches; ears short and angular, 1·6 long. Length of body 17, of tail 10·5. Fore leg about 9; hind leg about 9·7. Fore foot, from carpal joint, 2·8; greatest breadth 1·2. Hind foot, from tarsal joint, 4; greatest breadth 1·4.

The Formosan kitten, apparently about six weeks old, is similarly marked on the face, but has the spaces above the nose and under the eyes much richer chestnut. Its hair is longer and softer, of a dingy chestnut-brown, with the spots and marks fainter. Tail

thinner and less woolly than in the adult. Underparts white, with the spots also faint; legs more washed with chestnut.

41. Viverra zibetha, Linn. (Indian Civet.)

Viverra zibetha, Gray, P. Z. S. 1864, p. 512.
V. ashtoni, Swinhoe, P. Z. S. 1864, p. 379.

Common in the bamboo-covered hills of South China, from Canton to near Shanghai, and in the Chusan Islands; occurs also in Hainan (see *antea*, p. 227). I have never detected it in Formosa.

42. Viverricula malaccensis, Gmelin. (Little Spotted Civet.)

Viverricula malaccensis, Gray, *l. c.* p. 513.
Viverra pallida, Gray; Swinhoe, P. Z. S. 1862, p. 7.

Common in South China, Hainan, and Formosa.

43. Paguma larvata. (Gem-faced Civet.)

Paguma larvata, Gray, P. Z. S. 1864, p. 359; Swinhoe, Zoologist, 1858, p. 6223; P. Z. S. 1864, p. 381.
P. larvata, var. *taivana*, P. Z. S. 1862, p. 8.

This tree-loving species is found in the hills of the Kwangtung and Fokien Provinces and in Formosa.

I kept one alive for some months in 1856, chained in my verandah at Amoy. It fed on cooked meat in preference to raw, and did not seem to care much for either fowl's eggs or small birds. A stuffed snake threw it at once on its guard, and with a spring it seized it by the head and shook it. A shrimp was offered to it; this it smelt, and then rubbed its head over, first one side and then the other, as dogs do over carrion; it refused to eat it. When let loose it used to climb up the doors and legs of tables and chairs, putting one foot on each side, and pushing up with the hind legs. It walked backwards and forwards at the length of its chain, shaking the lower jaw, and would suddenly stand up on its hind legs, giving utterance to a shaking cry. It snapped at all dogs, and kept them at a distance. It slept during a great part of the day, but continued lively for the greater part of the night. The heat affected it a good deal, and made it pant.

The Society's Gardens have two live specimens of this species received from Formosa.

44. Urva cancrivora, Hodgs. (Crab-eating Mountain-mungoos.)

Urva cancrivora, Gray, P. Z. S. 1864, p. 568.

A specimen brought from the Fokien hills, near Amoy, agrees with Hodgson's specimens in the British Museum, from Nepaul.

Face long and pointed, with the nasal portion recurved; nose and upper lip with a deep vertical groove. Ears short, broad, and rounded. Soles of feet and underside of toes quite bare; claws strong. Fore foot:—first toe very short, second longer than the

fifth, the third and fourth subequal; a basal membrane attaches the second and third, and a membrane reaching to end of first joint the third and fourth. Hind foot: first toe diminutive, and placed well behind; third toe longer than the fourth, and united to it by a membrane to the first joint; second attached to the third, and fourth to the fifth, by short membranes. Head and feet clothed with short hair; rest of the body with long coarse and thick woolly under-fur; tail long and bushy, with long very coarse hair.

Nose and edge of lips brownish flesh-colour; iris deep brown. Hair of muzzle brown; upper lips, chin, throat, and a ridge of longish hairs extending from under the ears to the shoulder white. Head with light reddish-brown under-fur, the short hairs of the upper-fur being individually banded with black and white. Ear with short close-set whitey-brown hair, partly hidden by the hair of the cheeks. Upper parts of body with the under-fur brown at roots, buff above, the long hairs of the upper-fur having each a broad central black band and white tip, giving a hoary appearance to the coat; underparts with less black. Fore and hind legs blackish brown, sprinkled about humeral and femoral parts with buff specks. Tail buff white, with a few black-banded hairs intermingled.

Length from snout to root of tail 20 inches; tail 12, with an extra inch of hair at tip. Head 4·75; between ears 2. Palm to nail-tips 2·50; breadth of palm ·75. Sole to nail-tips 2·50; breadth of sole ·80.

This species has an extensive range in India, being found from Afghanistan through the Himalayas to Aracan; and we find it also occurring in South China.

No typical *Herpestes* seems to occur in China north of Hainan.

45. Nyctereutes procyonoides. (The Raccoon-like Wild Dog.)

Nyctereutes procyonoides, Gray, P. Z. S. 1868, p. 522.

Canis (*Nyctereutes*) *viverrinus*, Temm. Faun. Jap.; v. Schrenck, Amoorland, i. p. 63.

The "Raccoon or Civet Dog" ranges from Canton into Amoorland, and is also found in Japan. I have specimens of it from the Fokien hills, from Hankow, and from Shanghai; but I have not met with it in Formosa.

46. Vulpes hoole, sp. nov. (South-China Fox.)

Vulpes vulgaris, Swinhoe, Zoologist, 1858, p. 6223.

The Fox of the plains and lower hills of South China is in form and size very similar to that of Europe; but it is paler, wants the black spot on the sides of the snout, and has the colours of its coat differently arranged. I have placed in the British Museum an adult female and two cubs; but as their skulls are within the skins, I have not been able to remark on them.

Throat, along upper lip, and under neck white, washed with black on chin, with dusky-grey under-fur. Moustache-bristles black.

Ear ochreous in front, black behind, with yellowish chestnut at base. Round eye and on space in front bright rufous. Rest of head light rufous, grizzled with white on the cheeks and crown. Upper parts dingy ochreous, with more or less rufous on the hind neck and shoulders, and brightening into chestnut on the back; deep rust-colour near the tail, grizzled with white, the white increasing on the sides of the buttocks; under-fur of the back dusky grey at base, rust-colour above. Tail rusty chestnut on the upper surface, with some of the hairs tipped with black; its sides and under surface light dingy buff, with the apical half of each hair black; its end with a conspicuous white tip. Anterior surface of fore legs blackish grizzled with white, outer sides rusty grizzled with yellowish, inner sides buff, under surface and hair between toes dingy brown. The white on the chest continuous downward in a line to the middle of the belly. Belly from behind fore legs, on each side of the white line, chestnut buff. Abdomen whitish buff, with a faint tinge of purple. Anterior surface of hind legs as of fore legs; their sides and under tarsi bright rusty chestnut.

Head 7 inches; neck to root of tail 19; tail 13·5, with 3 inches of hair projecting beyond. Length of ear 3. Length of fore foot, from carpal joint to tip of nails 3·76; of hind foot 5·5.

The cub about six weeks old is covered with thick downy hair, with a few long soft hairs intersprinkled. The rufous patch between the eye and nose is well marked. Upper lip and throat white, blackish on chin. Chest dingy white. Ear yellowish in front, black behind. Paws and toes blackish on upper surface. Crown and upper back dingy rust-colour; shoulders and sides of the body whitish. Tail light dingy, with a rufous wash on the upper surface. Underparts light dingy rust-colour, with a purplish wash.

This Fox is common on the bare granitic hills of Amoy; and I have seen as many as six together at a time. When pursued they spring with great agility from rock to rock, and soon outrun a Greyhound on such rough ground; but on the plains they are no match for the dog. They descend to the plains at night, and rob the hen-roosts. I have also seen them in Hongkong island. About Tientsin, in North China, Foxes are also common; but I have never handled a specimen from any northern locality. No Fox has been found in Formosa.

47. Vulpes lineiventer, sp. nov. (South-China Mountain-fox.)

Two Foxes were brought to me at Amoy in 1867, from the higher mountains of Fokien. They are very like the Black-bellied Fox of Europe, *V. vulgaris*, var. *melanogaster*, Bp.; but are remarkable for having a fine line of chestnut on each side of the belly. They are very brightly coloured, and so differ conspicuously from the last-described pale species, though in form and size very similar. Unfortunately the skulls were not saved.

Head grizzled with white and chestnut, round and under eye rich chestnut. A broad angular mark of brown from anterior corner of

eye to lip. Moustache- and face-bristles black. Snout, under level of nose, part of cheeks, and throat white. Throat, under neck, chest, and central underparts black, grizzled with white. Inside of ear well clothed and of a lively buff colour, which extends to the edges; back of ear brownish black. Upper parts buff, many of the hairs of the hind neck and shoulders being broadly tipped with black. Crown and hind neck washed with chestnut, which brightens as it runs down the back in a broad line. Under-fur greyish brown. Fore legs clothed with reddish-brown under-fur, and covered with black and white hair, with a broad deep black line running down their anterior surface to the feet; under carpus and feet fine brownish chestnut, brown on the hair about the palms. A bright chestnut-buff line runs down each side of the belly, from the fore leg to the hind leg, and narrows as it advances down inner side of hind leg, where it is flanked inwardly with a white line. Thighs grizzled with black, white, and chestnut. Tail bushy, bright chestnut on the upper surface; with many of the hairs broadly tipped with black; under surface much paler, with more black; tip white.

Snout to root of tail 32 inches; tail 17, with 2·75 length of hair beyond tip. Fore leg 11 inches, hind leg 12·5. Ear 2·75 long, 1·75 broad at base.

48. ? Otaria stelleri. (Steller's Sea-bear.)

Otaria stelleri, Temm. & Schleg. Faun. Japon.

I have been informed by the European pilots at Shanghai that they have often seen Seals basking on some islands called "the Ruggeds," at the mouth of the Yangtsze. I have not been so fortunate as to get a specimen; but it is not unlikely that they will turn out to be the same as the animal recorded from South Japan.

Rodentia.

49. Sciurus castaneoventris. (Chestnut-bellied Squirrel.)

Sciurus castaneoventris, Gray, Ann. N. H. ser. 3. xx. p. 283; Swinhoe, P. Z. S. *anteà*, p. 231.

Sciurus erythræus, Swinhoe, P. Z. S. 1862, p. 11.

The Chestnut-bellied Squirrel is found in Hainan, the provinces of Kwangtung and Fokien, and in Formosa. The finest Formosan skins are rather larger, with longer tails, are bright deep chestnut on the underparts, and have broad buff tips to the hair of the apical half of the tail. The chin and chest in these is for the most part not red, but of one colour with the back. As in the Hainan and Chinese skins, the redness of the underparts is very variable in extent and intensity; and so is the yellowness of the tail. I have specimens from South Formosa of one colour throughout, and others with more or less red; and with a series before me I find it impossible to divide the animals from the different localities even into races. A fine specimen from North Formosa measures from snout to root of tail about 9 inches; its tail 9·5, including 2·5 inches of

hair beyond tip of tail-bone. *Sciurus lokriah*, Hodgs., *Sc. lokrioides*, Hodgs., and *Sc. erythrogaster*, Blyth, appear to be only three varieties of this Squirrel, the last very close to the Formosan. *Sc. erythræus*, Pall., has a fringed ear, and is distinct.

The British Museum has a red-throated Squirrel, marked from China. It is black on the upper parts and tail, chestnut on the underparts, fore legs, and hind feet, white on the sides and thighs. It differs somewhat from an animal also there from Borneo, but is so much in character with it that it is difficult to believe that it is really from China. Dr. J. E. Gray has described it as *Sciurus rufogularis*, in the Ann. & Mag. Nat. Hist. 1842.

50. Sciurus griseipectus. (Grey-breasted Squirrel.)

Sciurus griseipectus, Gray, Ann. & Mag. Nat. Hist. ser. 3. xx. p. 282.

China is given as the habitat of this plain-coloured species; but I have not had the good fortune to come across it in that country.

51. Sciurus chinensis. (Chinese Squirrel.)

Sciurus chinensis, Gray, Ann. N. H. ser. 3. xx. p. 282 (1867).

The Museum has two of this species from Shanghai, brought home by Mr. John Reeves. They are brown on the breast, upper parts, and tail; dusky white below, from chin to tail. Length of body about 7 inches, tail bushy and rather longer than the body.

On my journey from Ningpo to Shanghai, overland, I saw many of this species in groves of trees. It is arboreal in habits.

52. Sciurus m'clellandi. (M'Clelland's Squirrel.)

Sciurus m'clellandi, Horsfield, P. Z. S. 1839; Swinhoe, P. Z. S. 1862, p. 11.

This small striped Himalayan Squirrel, with tufted ears, is found in Hainan, the provinces of Kwangtung and Fokien, and in Formosa. M. A. Milne-Edwards assures me that he has also received it from Western Szechuen.

53. Sciuropterus kaleënsis. (Small Formosan Flying Squirrel.)

Sciuropterus kaleënsis, Swinhoe, P. Z. S. 1862, p. 359.

Mountain-forests of North Formosa. I know no species of this form from South China.

54. Pteromys grandis. (Large Red Flying Squirrel.)

Pteromys grandis, Swinhoe, P. Z. S. 1862, p. 358, pl. xlv.

Found in the north and central mountain-forests of Formosa. I have received it from various localities in the wilder parts of that island.

55. Pteromys pectoralis, sp. nov. (White-breasted Flying Squirrel.)

General colour a rich rufous; tail lighter, with brown at tip;

breast and streak down the centre of the belly white. Length from snout to root of tail 20 inches; tail 15, soft and bushy. The red fur of the body is sparsely sprinkled with white hairs. The fur is soft, moderately long, and much in character with that of *Pt. grandis*; in some lights it shows very brown.

A specimen of this fine species was brought to me at Takow, S.W. Formosa, in December 1865. It seems confined to the southern mountains of Formosa.

56. Mus bandicota, Beehstein (Linn. Trans. viii. t. 18). (The Bandicoot Rat.)

Mus nemorivagus, Hodgson.
M. setifer, Horsf. Zool. Res. in Java.

I have never observed the Bandicoot in China; but in Formosa, on the high road from Takow to the city of Taiwan, it was very abundant, living in holes at the foot of the hedges that line the way. I have not seen them in the towns. It would appear likely that this Rat was introduced into Formosa when the Dutch were in possession, in A.D. 1630.

I have the skin and skull of an adult from Formosa; the former measures from snout to root of tail 11·5 inches, tail 6·75; ear 1·1 in length. The skull agrees with specimens from India.

57. Mus decumanus, Pall. (Commercial Rat.)

Mus decumanus, Swinhoe, P. Z. S. 1864, p. 382.

Abundant in all large towns in South China and Formosa.

The white and pied varieties of *Mus rattus*, L., are to be seen in cages in the towns; but these are imported.

58. Mus indicus, Geoffroy. (Indian Rat.)

Arvicola indica, Gray; Hardwicke, Ill. Ind. Zool. i. t. 11.

My largest specimen from Formosa is 10·75 in length, tail imperfect, ear ·66. A smaller one, length 7, tail 5·25. Colour above light chestnut-brown; most of the hairs broadly tipped with black, giving in the adult a streaky appearance to the back. Long fine moustaches on muzzle white, short ones black. Sides of muzzle, feet, and underparts dingy white, with a tinge of yellow. Tail sparsely covered with short spinous bristles, brown on the upper, white on the under surface of the tail.

In the city of Taiwan, Formosa, this large Rat was nearly as common as the Commercial Rat, and seemed to associate with it. I have not noticed it in the towns of the Chinese main.

59. Mus alexandrinus, Geoffroy. (South-European Rat.)

Adult male measures 8·6, tail 6, ear ·7. This species is a good deal like the ordinary grey Rat, but has longer and richer-coloured pile, the ear is larger and more oval, the feet smaller, and the tail proportionately longer, and with much more short hair, especially near the tip. Upper parts dark yellowish brown, with many of the

hairs on the back and rump broadly tipped with black. Underparts dingy, tinged with ochreous. Moustache-hairs long, fine, and dark. Identified by Dr. Peters.

This Rat is found in country villages and outplaces about Amoy, and would seem to be an earlier introduction than the *M. decumanus*, from the face of which it has probably retired. The latter is the only species one sees in the town. It is difficult now to discover what were the House-rats of China before the introduction of the three last-named species. In villages and country towns, where the latter have not established a footing, Country-rats, which often scale trees, are found entering houses and running about the streets. In Formosa, where the Commercial Rats are not so widely extended, several species of these Country-rats occur; but in China I have as yet only noticed the *M. rufescens*.

60. Mus coxinga. (Spinous Country-rat.)

Mus coxinga, Swinhoe (errore *coninga*), P. Z. S. 1864, pp. 185, 382.

Most numerous in the north of Formosa, less so in the south-west. I have not heard of it in China. Does not appear to enter large towns, but is found abundant in villages of the interior, to which the bigger Rats have not reached.

61. Mus rufescens, Gray. (Chestnut Country-rat.)

Mus flavescens, Elliot.

This species was determined by Dr. J. E. Gray from specimens I brought home in 1862. It used to occur in the gardens at Amoy, and I have several times seen it running up and down trees in the daytime. I jotted down the following note on a specimen I shot at Amoy on the 17th May 1859:—Length of body 4·3; tail 3·8; head 1·5; ear ·7, large and oval. Fur short and soft, with a few long soft hairs interspersed. Moustache formed of long, delicate, black and white hairs. Upper parts pale reddish brown, ochreous about the head; underparts whitish; all the under-fur slaty grey. Tail scaled as usual, and set with many short pointed setæ.

This Rat is found also in many parts of India. I have not noticed it in Formosa.

62. Mus canna, sp. nov. (Silken Country-rat.)

Mus —— ?, Swinhoe, P. Z. S. 1864, p. 382. no. 26.

♂. Length 5·5; tail 5·25; ear bare, ·6 high, oblong, rounded at tip. Hind foot from tarsal joint 1·4. Hair short, soft, and mouse-like. Front teeth narrow and slender, with orange surface. Upper parts and legs brown, tinged with light chestnut, more conspicuous on the head and along the sides; underparts dingy ochreous; tail light brown, nearly naked, with minute inconspicuous setæ. Under-fur light slaty. It resembles the immature of *M. indicus*, but has smaller feet, and a soft silky pelage.

A Rat affecting villages in the country near Tamsuy, Formosa, and ascending trees.

63. Mus losea, sp. nov. (Brown Country-rat.)

♂. Length 6 inches, tail 3·75. Teeth broader than in the last, and of the same colour. General colour of upper parts a rich brown, many of the hairs of the head and upper parts tipped with black, giving a dark appearance in some lights; fur soft and moderately long; under-fur dark slate-grey. Underparts dingy whitish; legs brown, with a streak of whitish on each edge of fore foot. Ears moderate, naked. Moustache rather short. Tail brown, with minute black setæ scarcely visible.

This is also a Country-rat at Tamsuy, Formosa.

64. Mus ningpoënsis, sp. nov. (Short-eared Field-mouse.)

Length 3·25; tail 2·75. Lower incisors longo-triangular. Ear ·35, with short hair. Upper coat rich chestnut-brown, with deep slate-coloured under-fur; lower parts and feet white. Moustache-bristles short and very fine. Fore foot minute; hind foot ·7 from tarsal joint. Tail light brown above, whitish below, with minute scattered white hairs.

This little creature I picked up at Ningpo, in the consulate garden. It is a field-mouse; and "is," says Dr. Peters of Berlin, "nearly related to the European short-eared mice, *M. agrarius* and *M. minutus*, being larger than the latter, and without the dark dorsal streak of the former."

65. ? Mus badius, Hodgson. (Long-tailed Field-mouse.)

Mus —— ?, Swinhoe, P. Z. S. 1864, p. 382. no. 27.

This long-tailed Field-mouse, with chestnut upper and whitish underparts, allied to *M. sylvaticus*, L., of Europe, appears to have a wide range in China, if I am right in identifying the one I got at Tamsuy with that I saw in Hainan. Unfortunately both the specimens I picked up were too mangled to preserve. I have therefore not been able to identify it.

66. Mus argenteus, T. & S. Faun. Japon. (Yellow House-mouse.)

Mr. S. Bligh, at Canton, gave me a small fawn-coloured mouse, with light under parts and rather long tail, which answers well to the species described in the 'Fauna Japonica.' I have not seen it from other parts of China.

67. Mus musculus, L. (Common House-mouse.)

Mus musculus, Swinhoe, P. Z. S. 1864, p. 382.

Occasionally seen in houses both in South China and Formosa; probably introduced. Black and white varieties are often kept by the Chinese; these are brought from the Straits.

68. Rhizomys chinensis. (Chinese Bamboo-rat.)

Rhizomys chinensis, Gray, P. Z. S. 1831, p. 95; Ill. Ind. Zool. t.

This large Bamboo-rat was procured by Mr. John Reeves at Canton. I have not heard of it from other parts of South China.

69. Hystrix subcristata, sp. nov. (Subcrested Porcupine.)

Hystrix, sp., Swinhoe, P. Z. S. 1864, p. 378.

I had often heard of a Porcupine occurring both at Swatow (province Kwangtung) and at Foochow (province Fokien), and knew that it was an animal well known to the Chinese as the "Bristly Pig" (Court dialect, *Haochoo*; Amoy, *Ho-te*); but it was not till May 1867 that I procured specimens. One of these was brought to me alive, and I shipped it for the Society; but it got overfed by the passengers, and died before the vessel left the port. The other specimen, a skin with skull, I have brought home. The skull is very similar in form to the two of *H. hodgsoni*, Gray, in the British Museum, and is like in form of teeth. It is the skull of an old animal, whereas the Museum specimens have open sutures, and show juvenility. It is larger, and exhibits differences of detail; but it is questionable whether these may not be attributable to advanced age. Judging from the skull alone, one might be inclined to identify our animal with the Nepaul species; but the external form of the Chinese Porcupine displays a conspicuous occipital crest, which is entirely absent in the other. Hodgson and other zoologists lay great stress on the want of this crest (see Waterhouse, Mammalia, iii. 461); and the mounted skins in the Museum, both more than two-thirds the size of my specimens, bear no trace of it. My specimens, on the contrary, differing in age, *inter se*, have each a crest. I follow, therefore, Dr. J. E. Gray's advice, and separate the Chinese animal from its Nepaulese ally, though the question as to its distinctness will not be satisfactorily determined until we ascertain either that the Himalayan Porcupine has the crest when fully adult, or that the Chinese Porcupine is destitute of it in its younger state.

The following is a description from the living animal, corrected by help of the skin:—

Snout to root of tail about 28 inches; tail about 5, covered at its base by the protruding quills of the rump, and carrying a bunch of short white truncated quills on pedicles on the apical third of its length. Palm to end of nails 3 inches; sole to end of nails 4. Head brown, with rather bare brownish flesh-coloured cheeks. Iris deep brown. A few short scattered hairs round eyes. Ears oval, flesh-brown, sparsely covered with whitish hairs. Nose deep brown. Muzzle and lips with short brown hairs. General colour light purplish black, much deeper on the legs; white on the long hairs of hind neck, with a crescent-shaped mark of the same colour across breast. Head, legs, and belly clothed with short stiff bristles; neck, anterior half of back, and sides with short furrowed black spines from 1 to 3 or more inches long, ending in sharp points, thicker on the back, and tipped with yellowish. From the occiput spring long stiff black bristles, white on the apical half; and along the hind neck runs a bushy ridge of the same from 2 to 5 inches long, black, with more or less white. Hind part of back with long, thick, rigid quills, the longest about 9 inches, mostly white at base, with more or less white at tip; their central portions black, without

the usual white rings; interspersed among these are a few long thin quills, chiefly white, and reaching a foot or more in length. Skin below the quills flesh-white, sprinkled with scattered tawny hairs, which occur amongst the bristles as well. Footpads brown; claws brownish horn-colour.

The Porcupine occurs in Hainan (see *anteà*, p. 233), but in Formosa I have never detected it. The Taiwanfoo Gazetteer (a Chinese work), however, includes it in its list of the natural productions of that island. It describes it as "covered with arrows like the quills of the Hedgehog, which make a rustling noise when the creature walks. These arrows it can dart at people, but not to a greater distance than from eight to ten feet."

70. Lepus sinensis. (Chinese Hare.)

Lepus sinensis, Gray, Hardwicke's Ill. Ind. Zool.; Swinhoe, P. Z. S. 1862, p. 359.

This small, coarse-haired little Hare is the only species in Formosa and South China. It is yellowish brown on the upper parts, the hairs being broadly tipped with black; a little white occurs above and behind the eye. Ears about the length of the head, with a light buff rim, and a blackish-brown apical spot on the hinder surface; a patch of light rust-colour on the hind neck; legs and flanks a lighter shade of the same; belly and inside of thighs yellowish white; tail brown on the upper surface, with a few black hairs intermingled; its under surface light buff; under-fur of coloured parts light slate-colour.

Hainan possesses a Hare of its own, my *L. hainanus* (see *anteà*, p. 233, Pl. XVIII.), and North China the *L. tolai*, Pall., in company with the species under notice.

Ungulata.

71. Sus leucomystax. (White-moustached Boar.)

Sus leucomystax, Temm. & Schleg.

In February 1869, Mr. Ludlam, an American gentleman at Shanghai, shot in the neighbourhood of that settlement two large wild Boars, and very kindly allowed me to take the skin and skull of one of them. This animal measured between five and six feet, and had a thin tail about ten inches in length; length of skull 18; ear 3·75 in height. The upper parts of its skin are clothed with coarse black bristles, broadly tipped with light yellowish brown, and from 4 to 5 inches in length, longest on occiput and along the back; the under-fur is yellowish brown, and like tow. Cheeks, under parts, and legs black; abdomen, between thighs, anal region, and tail dingy white, the latter with a black tuft at tip. The moustache-mark is formed by broad whitish tips to the black bristles of face. Ear small and pointed, with white-tipped black bristles inside and on anterior surface, behind with black bristles, on the upper half forming a low fringe, bare at base and on the portion of the head where the ear rests. The under-fur on the lower parts is short and scanty. Nose sprinkled with a few short stiff hairs. The face is

black, with the exception of the moustache-mark; the top of the head and upper parts show light yellowish brown, and the under-parts black.

Fig. 1.

Head of *Sus leucomystax*.

Fig. 2.

Molar series of *Sus leucomystax*.

The want of warts on the face, the small ear, and the absence of a beard distinguish this animal at once from *Sus scrofa*, L.; the want of a crest and beard and the black hoofs from *Sus indicus*, Schinz, of India.

This Pig is now abundant, and to be found of fully developed size, in a country where, before the devastations of the Taiping rebels, the land was highly cultivated and not a wild pig was known. The natives declare that they are merely the descendants of the pigs of their farmsteads, which were abandoned and ran wild.

The skin and skull from Shanghai I have brought home; and Dr. Günther was so kind as to help me to compare the latter with skulls of *Sus scrofa*, L., of Europe, and *S. indicus*, Schinz, of India,

in the British Museum. *Sus scrofa* was at once distinguished by its nasal bones exceeding the head in length, and by the comparative greater distance of the palatal notch from the bulla. The Shanghai and Indian skulls, all of nearly equal size and age, were then carefully compared; and, with the exception of a rather more convex vertex in the former, there was no appreciable difference. Dr. Günther gave it as his opinion that, judging from the skulls, he would consider the Shanghai and Indian animals to be of the same species.

The authors of the 'Fauna Japonica' consider the *Sus leucomystax* of Japan the stock of the Japanese domestic Pig, from the resemblance of the two. The figure given in that work bears a strong likeness to our Shanghai animal; but the description of the species is too scanty for certain determination.

72. Sus taivanus. (Formosan Wild Boar).

Sus taivanus, Swinhoe, P. Z. S. 1864, p. 383; Gray, P. Z. S. 1868, p. 26.

Porcula taivana, Swinhoe, P. Z. S. 1862, p. 360.

From the last, or what we take to be *Sus leucomystax*, the distinction of the Formosan animal is apparent both in skin and skull. I have the skin and skull of one animal about two-thirds grown from Tamsuy (N.W. Formosa), and a large series of the skulls of adults procured in the central mountains of the island from the native Indians, who use them to ornament their shrines. These skulls average in length a foot; and in many the disappearance of sutures and the full development of teeth prove maturity, and show that the Formosan animal does not attain the great bulk of the larger species. Dr. Günther kindly assisted me in comparing the skulls. In general characters they are allied to those of *Sus indicus*, but the crown of the head, or space between the orbits, is on the whole flatter than in the latter; and, with the exception of the last molar, the molars (including the premolars) are comparatively larger—indeed, so much so that their united length (though the skulls are greatly smaller, as 12 to 17) about equals that of the same in the other. Their tusks are comparatively smaller and weaker. The females, as a rule, have the vertex much broader than the males; but its breadth varies greatly in both sexes.

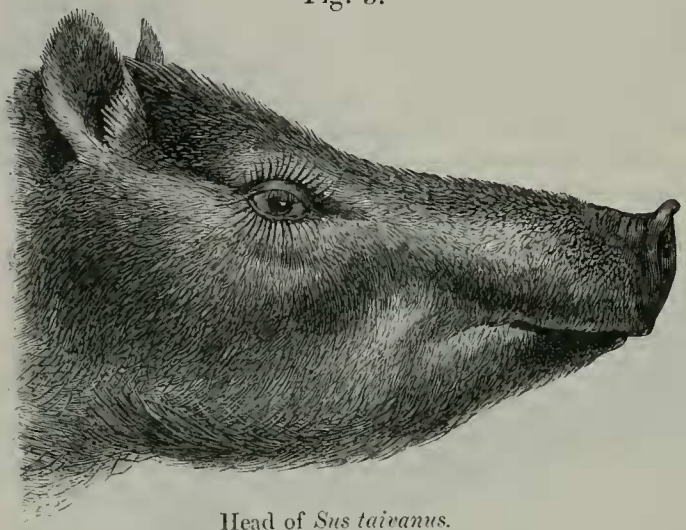
The chief difference in its external form appears to be in the shape of the ear, which is broad, rounded on the edge, and drawn to a point in the present species. The accompanying figures (1 and 3) will illustrate this.

In the 'Proceedings' of this Society for 1862, p. 360, and for 1864, p. 383, I have already described the appearance of this species when only a few weeks old, and when some months old. I will now describe the animal about two-thirds grown that I procured at Tamsuy.

Length 3 feet, of tail 4 inches, of skull 10; height at shoulders about 21 inches; ear 2·5 long, 1·75 broad. Body sparsely covered with light yellowish-brown hair, intermingled with black bristles, which are longer, coarser, and more conspicuous. Ear short and broad, produced to an apex, with some yellowish hair inside and on

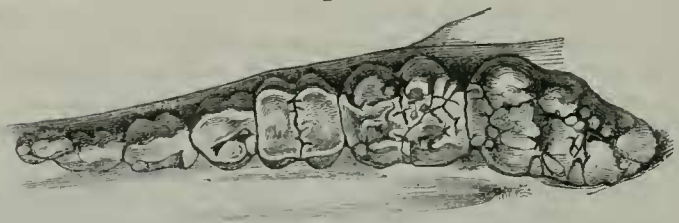
anterior surface, and a few blackish hairs behind, the base of the hind part being naked, and no hairs overlapping on its upper edge to form a fringe. From the occiput along the back to beyond its centre runs a ridge of bristles about 3 inches long, for the most part

Fig. 3.



Head of *Sus taivanus*.

Fig. 4.



Molar series of *Sus taivanus*.

black, forming a dorsal mane. Moustache-streak scarcely visible; in the advanced stage of the youngling this is white and conspicuous; but the moustache-streak is no specific character, as many species of Pigs have it more or less. Tail dressed with a few whitish hairs, with long black bristles at its tip. Hoofs brownish black.

The Taiwanfoo Gazetteer speaks of a much larger Pig inhabiting the island than the wild species appears to be. But, as in many other animals he speaks of, the Chinese author either brings his notions from China, or spices his history with exaggeration. He says, "the Yay-che (or Wild Pig) has the ears and tail rather small; its hair is bristly and of a brown colour; and it differs somewhat from the domestic Pig. *The largest are as big as a cow* (meaning, however, a small Chinese Cow) with *enormous* tusks projecting beyond the lips. It gashes trees and can break them down. Its

strength can oppose the Tiger. When enraged it will wound people with its tusks, abruptly breaking their ribs or goring their bellies. It rushes on its object like the wind. Hunters dare not shoot them."

The Chinese colonists have introduced their black hollow-backed breed of Pigs from South China; and among the villages of the plains you see none but these. At Takow a European imported a large white English tame boar, and it was allowed freely to cross with the Chinese Pigs; and an improved piebald breed has been the result, and has shown itself perfectly fertile when crossed with the sire, with one another, and with the Chinese Pig.

In Ogilby's 'Atlas Chinensis,' ii. p. 8, we read that on the arrival of the Dutch in Formosa in the early part of the seventeenth century, when the Chinese were just beginning to colonize, every aboriginal "woman had commonly a great Pig running after her, as we use to have a Dog." Thus before the islanders had intercourse with the outer world they had a Pig of their own, which is still found among the tribes of the central mountains. These are curious animals, of a chestnut-red colour throughout; but I have occasionally seen examples patched with white. The young of this breed are also red, the skin and all the soft and horny parts being stained with more or less of the prevailing colour. From the form of this Pig and the small size and shape of its ear, I should think that it is doubtless derived from the wild stock of the island. The traditions of the natives confirm this impression; and the Pig was the only domestic animal they were found to possess when the island first came under European observation. But why should domestication have changed the animal to a red colour instead of to black and white, the usual colours that first develope under its influence? As a rule animals in their variability have a less tendency to erythrism than to either albinism or melanism; but domestication in this species has inaugurated change by developing the first in preference to the other two. The reason why, I cannot divine. I have found this red Pig cross readily with the Chinese black Pig; and the young in such cases appeared with indications of the stripes of the young wild Pig. But this I take to be due to the intermingling of the colours of the parents, and would probably have been carried into maturity had the offspring lived. My time was unfortunately too short to continue experiments of this kind; so I sent several of the red Pigs to England in the hope that somebody at home would take the matter in hand. But my specimens were not hailed with a welcome.

From the savages of the east coast of Formosa I received a pair of Pigs, black, white, and red, with moderate-sized ears, long face, and long bristles on the upper parts. These looked very like a cross between the red Pig and a domestic English Pig; and it is not impossible that some ship may have supplied to the natives on that coast the progenitors on the one side. The skull, however, of this Pig shows no great difference from that of the wild stock of the island, except in having a more prominent forehead and in the greater length of the bones of the face.

Whilst at Amoy I received from Chefoo (North China) a strange variety of tame Pig, with a piebald woolly coat, the young of which

called to mind some breeds of Rabbits. This Pig also bred freely with the red Pig, the offspring partaking of the characters of both parents.

RUMINANTIA.

73. HYDROPOTES INERMIS. (Hornless River-deer.)

Hydropotes inermis, Swinhoe, P. Z. S. 1870, p. 89, Pls. VI. & VII.

This is the hornless so-called Hog-deer that resorts to the islands of the Yangtsze near Chinkiang, and is sold for venison in the Shanghai market. I have not noted its occurrence elsewhere in China. M. Alphonse M.-Edwards has pointed out to me that in the shape of its skull and form of teeth this animal approaches the fossil *Dremotherium feigneuxi*, Geoffroy, from the Miocene of France.

Hainan produces a Mouse-deer, which I have made out to be the *Tragulus meminna*.

74. CERVULUS REEVESI. (Reeves's Muntjac.)

Cervulus reevesi, Ogilby, P. Z. S. 1838, p. 105; Swinhoe, P. Z. S. 1862, p. 361.

Found from Canton to Ningpo and in Formosa. In Hainan it is replaced by the allied Indian form, *C. vaginalis* (Bodd.).

75. CERVUS PSEUDAXIS, Eydoux & Souleyet. (The Formosan Spotted Deer.)

Cervus taivanus, Blyth, J. A. S. xxxix. p. 90; Sclater, P. Z. S. 1860, p. 376, et 1862, p. 152, pl. xvi.; Swinhoe, P. Z. S. 1862, p. 362.

In the 'Transactions' of the China Branch of the Asiatic Society at Hongkong for 1847, the President (Dr. Bowring) is reported to have said (p. xix) as follows:—"Keying sent me from Canton an adult male and female and a fawn of what I had hoped, before they arrived, might turn out a new species of Deer; but they proved to be identical with the Fallow Deer which we have at home." This led me to suppose (P. Z. S. 1864, p. 169) that the *C. dama*, L., was also an inhabitant of China; but I have since visited the Viceroy's gardens at Canton, where some of the Deer still remain, and find that all in those grounds belong to the Formosan species, and have been bred from individuals introduced from the island. I was also misinformed as to the occurrence of *Cervus axis* in China. The animals of this species in Messrs. Jardine, Matheson, & Co.'s gardens in Hongkong (P. Z. S. 1864, p. 169) were brought from India, and not from Hankow. In Hainan the *Panolia frontalis* (Hodgson) (*Cervus eldi*, Guthrie) is found; but I have not heard of any species of spotted Deer occurring in China south of the river Yangtsze. The *C. pseudaxis* is restricted to Formosa; North China produces a larger allied species (the *C. mantchuricus*, mihi), and Japan a smaller form (the *C. sika*, Temm. & Schleg.).

The Formosan species has now for some years been a constant inhabitant of the Society's Gardens, and has bred. Its development and change of coat have been observed and will shortly be illustrated by figures in the very excellent paper that Dr. Sclater has given to

the 'Transactions.' I have only a few notes to offer on the appearance of some skins that were brought to me at Takow. One was a stuffed skin of a fawn about 19 inches in length. Its colour was rich yellowish brown, deeper on the back, and paling on the sides and legs; face redder, with a blackish-brown forehead, and dark brown behind the ears. Inside of ears, underparts, inner sides of legs, and under tail pure white, the throat and neck above being tinged with red; upper surface of tail red. Two rows of yellowish spots flank the back on either side, with a few irregular ones outlying on the shoulders and hind quarters.

Three skins of adult animals are in different stages of coat:—the winter, when the hair is brown finely mottled, the list down the back showing itself in a deep brown line becoming black over the tail, the underparts a dull white; hair not long and spots scarcely visible. The autumn dress, evidently of a young male from its shagginess and coarseness; the list down the back much blacker, the brown tinged with a rich red, and the white spots beginning to fade. The third skin shows the appearance of the female in summer—of a rich orange-buff, browner on the back, with a deep black dorsal ridge, the white spots pure and conspicuous with a wavy white line of coalescing spots below from fore to hind leg, under which the buff again appears, but very pale, and is succeeded by the white of the underparts. In all three skins the upper surface of the tail and the rump at its base are black, the lower surface of the tail and the inner side of buttocks pure white.

The following Chinese notice on the Formosan Deer from the Taiwanfoo Gazetteer is perhaps worth recording:—"The Formosan hills have no Tigers; hence Deer are very numerous. In former years the whole island was given up to hunting-ground by the aborigines; now it is ploughed and sown by the Chinese settlers, so that fair fields extend as far as the eye can reach, and the Deer have betaken themselves to the mountains. They are there hunted and captured; but the horns of the Formosan species are thin and soft at the base, and not equal to the plump branchers from Leaotung Province (North China). A hundred pairs when roasted will only produce about twenty pounds of medicinal glue. Though Deer abound, you may seek a piece of venison in vain in the markets. At the winter and spring festivities, however, the natives cut venison up into square blocks weighing over a pound each, and, after steeping them in brine, forward them to the departmental and district cities. The colour of the venison so preserved is black, and its taste changed; it is not fit to pick up with chop-sticks; and yet its price is no trifle.

"Deer by their horns record their years, each fork on the antler signifying one year, much as the age of horses is recorded by their teeth. The aborigines shoot Deer for food; but no one has ever met a buck carrying seven or more forks on the antlers. It was declared in former days that Deer were fairy animals of great longevity; and it was stated that at the age of 500 they were white, and at 1000 black. But these stories must be fables; for the natives at Chuhtsan shot a small Deer of a pure white with only two forks to its antler. This albinism cannot, therefore, be otherwise than due to an accidental

variation in the colour of the hair. Three years after birth the Deer commences to horn. At the end of the year the horns drop away as do the milk-teeth of infants. Other horns appear in their place, which are retained throughout the animal's lifetime; but every year an extra fork is added.

"The teats appear in the doe at the age of four months. Just before they show she gets extremely fat. When big with young, her skin is soft, smooth, spotted, glossy, and very lovely. As soon as the doe has finished suckling and observes her fawn getting to maturity, she deserts it and repairs to other hills, fearing that her own issue might entertain an improper affection for herself. Animals do not confuse the ties of consanguinity, the horse excepted. The stallion, however, when he does commit incest with his mother, soon after dies. The doe deprives her offspring of the opportunity by setting a distance between herself and fawn; for she deserts it and betakes herself afar."

I have lately examined the type specimens in the Paris Museum of *Cervus pseudaxis*, and I am convinced that they belong to the Formosan species.

76. Cervus (Rusa) swinhoii. (Swinhoe's Deer.)

Cervus (*Rusa*) *swinhoii*, Sclater, P. Z. S. 1862, p. 152, pl. xvii.; Swinhoe, P. Z. S. 1862, p. 364.

In the central ranges of Formosa near Mount Morrison this brown deer is very common; and on a visit I paid to the wild tribes of these parts in February 1866 I found them hunting the Deer with dogs*. A place is cleared in the forest, where a party of men hide armed with matchlocks; the dogs yelp after the deer and drive them into the open, where the hidden sportsmen get easy shots at them. The son of the chief with whom I was staying had just returned from a successful battue with the robust antlers and flesh of a large buck. I induced him to return for the head, which he had thrown away on the field. I was thus enabled to secure a fine skull for the British Museum.

The young of this species about half-grown is reddish brown, with the tail bushy and black, but reddish at its root. Sides of the body paler, and the belly blackish brown. Legs pale towards the hoofs; the latter black. Under surface of tail, abdomen, and inner sides of hind legs down to middle of shank yellowish white, the breast and belly being blackish brown. Under surface of head and neck mottled whitey brown. Crown of the head with many of the hairs tipped with black; from the occiput a dark line runs down to the base of the tail. Ears blackish brown, tipped and margined with ochreous white, and whitish on their insides.

The adult, in summer, has its coarse hair deep brown, faintly mottled, rufous on the rump; between the fore legs and the thighs ochreous white; tail bushy and dark. In winter it becomes a deeper brown. The Society's Gardens have had two or three examples of

* The Dogs in the possession of these aborigines were of the ordinary Chinese breed procured from the colonists.

this animal alive; and Dr. Sclater is doing it justice in his paper for the 'Transactions.' Fig. 5 represents the antlers of a mature individual which I procured in South Formosa.

Fig. 5.

Cervus swinhoii.

I have not heard of any species of *Rusa* occurring on the main of China; but in Hainan the *C. hippelaphus* appears to abound. From North China we have the *Cervus xanthopygus*, A. M.-Edwards, the *Elaphurus davidianus*, A. M.-Edwards, and the *Capreolus pygargus* (Pall.).

77. Capricornis swinhoii. (Swinhoe's Goat-antelope.)

Capricornis swinhoii, Gray, Ann. & Mag. Nat. Hist. ser. 3, vol. x. p. 320; P. Z. S. 1862, p. 263, pl. xxxv.; Swinhoe, P. Z. S. 1862, p. 361.

Found throughout the hilly ranges of Formosa.

The young have the ears white on their anterior surface or, sometimes, more or less white throughout. The region of the lips is whitish; and the chin and throat light buff, with a brown spot on the former. The abdomen and between thighs are also light buff, and the feet lighter red. The hair of the body is shorter; they are otherwise like the adult.

The adult is of a deep brown throughout, tinged with red. The crown and a line down the back deep brown. Lips whitish. Chin and throat chestnut, with a brown patch on the former. Ears light buff inside, reddish brown behind. Abdomen brownish buff. Feet deep chestnut; hoofs black. Hair about 1·5 inch long, thick-set, harsh, and a little wavy. It does not acquire horns till it is nearly full-grown.

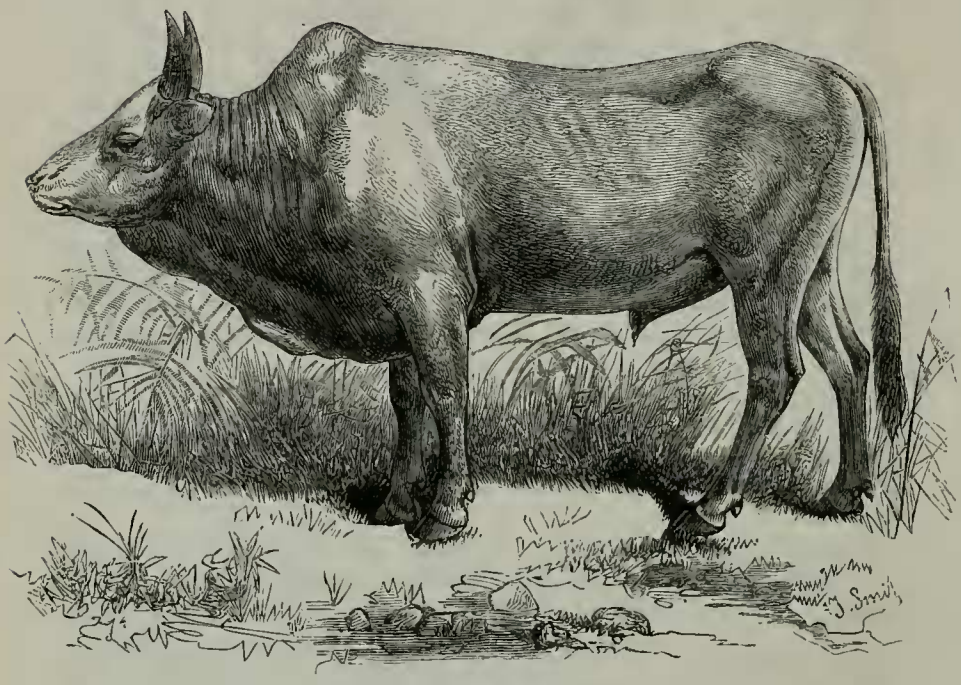
The nearest ally to this curious Antelope appears to be the *Capricornis sumatrensis*, of which there is a specimen in the British Museum.

Capricornis crispus (T. & S.) of Japan appears to have greater affinity with the newly described *C. caudatus*, A. M.-Edwards, from Peking.

78. Bos chinensis. (South-China Cattle.)

The small Yellow Cow of South China is a peculiar race, combining, as it seems to do, the characters of *Bos indicus* of India and *Bos taurus* of Europe. It has the head and dewlap in character with the former, with a small hump, the straight back, and hind quarters of the latter. Mr. Blyth maintains that it is a cross between the two; and this opinion may perhaps be borne out by the fact that the North-Chinese large cattle are certainly like our European ordinary breed. In the 'Taiwanfoo Gazetteer' I read this passage under the head "Yellow Cow":—"The neighbouring hills have this animal in

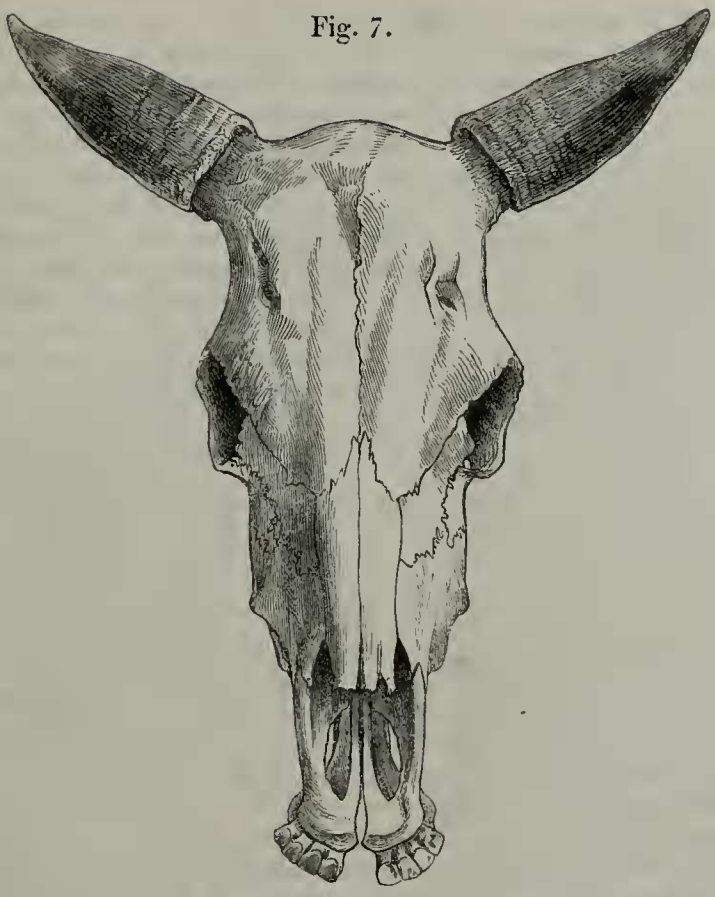
Fig. 6.



Bos chinensis.

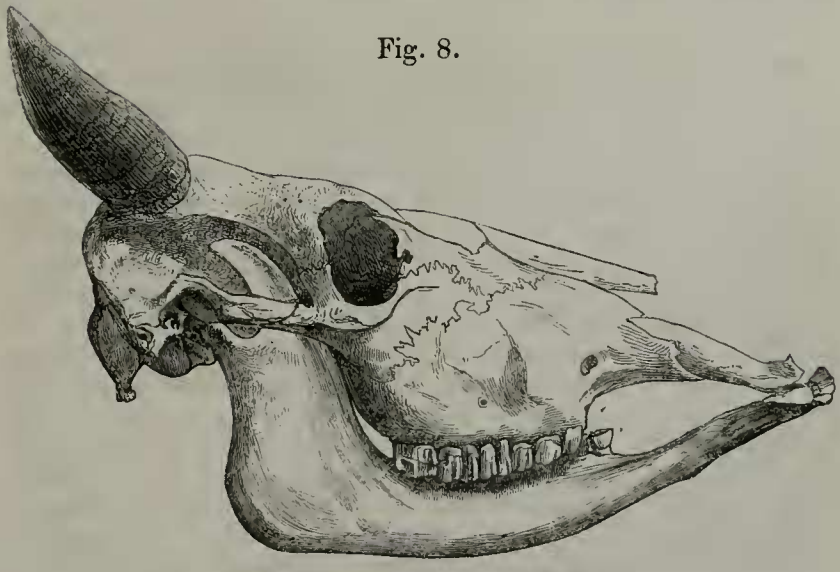
abundance. They are caught and tamed, and are trained for use in the ploughing of fields and drawing of carts;" and further on, "Formosa has an abundance of wild cattle, occurring in herds of hundreds and thousands. When it is desired to capture them, a wooden stockade is erected with four sides, in one of which is left a door. The cattle are driven towards it until they all enter, when the gate is shut on them and they are barred in and left to starve. They are afterwards by degrees haltered and bridled, and treated to fodder and beans, until they become not different from domestic cattle." Were these wild cattle indigenous to the island, or were they simply feral descendants of an introduced race? If the latter, who introduced them? The Chinese, when they commenced to settle in Formosa, found enormous wild herds already there. The

Fig. 7.



Top view of skull of *Bos chinensis*.

Fig. 8.



Side view of skull of *Bos chinensis*.

wild natives did not use them except for food; and it is not likely that they could have conveyed domestic cattle in the small canoes by which they straggled to Formosa. If they had, we should expect to find some peculiar breed, whereas, as our author tells us, they "were not different from (South-China) domestic cattle." To show that they were derived from the Chinese breed, we should have to believe that the Chinese had earlier communication with the island than their records declare. I take it, then, that the wild Formosan Cow was indigenous to Formosa, and of the same species that ranged throughout South China, from which the present domestic cattle of the south are derived. I have not heard of its being found wild in the present day in China; and in Formosa the wild race has almost, if not quite, disappeared. In the central mountains they are kept in a semi-wild state, and from there I procured the skulls of an adult male and female and a live bull. The bull I had photographed and now exhibit its portrait (fig. 6, p. 648); and the skulls are deposited in the British Museum. The figure shows a better and stronger build than ordinary South-China Cattle possess, and proves the two to be of the same race. The Chinese have done little to improve their breed of cattle; and you may see this kind in the country from Canton to Ningpo unchanged in form or shape of horns, but, as a rule, a little smaller and more degenerate than the wilder animals from the Formosan mountains. The skull of the bull (figs. 7 & 8) measures 19·5 inches in length; the horns are somewhat conical, measure 8 inches in length each, and stand outwards and backwards. The animal is a rich chestnut-brown with whitish underparts and feet. Its horns and hoofs are black.

I have never heard of the Buffalo occurring wild in either China or Formosa. The domestic variety, used as a beast of burden by the Chinese, is short-horned and apparently the same breed as that found in Manilla.

Edentata.

79. Manis dalmanni, Sundevall. (Scaly Ant-eater.)

Manis (*Pholidotus*) *dalmanni*, Gray, P. Z. S. 1865, p. 366; Swinhoe, Zoologist, 1858, p. 6224; P. Z. S. 1864, p. 381.

In June 1867, at Amoy, I purchased a family of Scaly Anteaters, consisting of the mother and father and three little ones. The old ones had dim watery eyes and were rather slow in their movements, walking on the sides of the hind feet and on the tips of the claws of the fore feet. The young were brighter-eyed and active, running about the room in all directions, standing on their hind legs and assuming a variety of curious positions; but their habit of walking was essentially the same as in the adults. I kept them all alive for some days; but I never heard them utter any cry, not even a moan.

The adult male measured in entire length 33·25 inches; tail 13·5; tip of nose to upper corner of ear 3·1; height of ear 1·1; across head from ear to ear 2; anterior corner of eye to tip of nose 1·9; breadth of eye ·5; breadth of gape ·9, of muzzle ·7, of nose ·5; length of sole of hind foot 2·4, greatest breadth 1·4; length of middle claw of fore foot 2·1.

Head, ears, the under and all fleshy parts milk-white, or the colour of cooked pork, the nose and muzzle having a tinge of purple. Cheeks, throat, and underparts sprinkled with shortish stiff coarse hairs of a light reddish sandy colour. A few lighter-coloured bristles project from under the vertex of each scale from the occiput to the tail. Scales short and broad, and usually purplish brown for two-thirds of their length, the tip portion yellowish-grey horn-colour. On the sides of the body, and especially along the legs, the scales are placed far apart, exposing the white skin. The small scales on the sides of the fore legs are often sunk beneath the level of the bulging skin. Besides the basal vertical striæ on the scales, there are often (on the large scales chiefly) two or three transverse furrows near their bases. The large scales are held to the skin by a fleshy nipple-like pimple on each side of them adhering to their basal angles. Claws dingy yellowish.

A young male measured 21·75 in entire length; tail 8·75. Head comparatively shorter and deeper than in the adult. Face pinkish white, washed about the muzzle and borders of ears with blackish grey; nose and lips purplish grey. Tongue about 2·75 long, ·45 broad, narrowing to ·2, and rounded at tip; composed of a vermiform centre with fleshy side-rims, gradually flattening towards tip. Bare parts milky white. Reddish sandy hairs occur about the lower lobe of the ear (which is shaped something like the human ear), the throat, and underparts; in the first two longer and more numerous than in the adult. Longer and coarser whitey-brown hairs spring in tufts of five or so from under each scale. Scales more uniform and compact, even on the legs, than in the adult, more striated longitudinally and transversely, and much darker in colour, resembling the side-pieces of an acorn-barnacle (*Balanus*). Many of the lateral scales of the neck, body, and legs carinated; general colour of scales glossy blackish brown with a tinge of sea-green, sometimes tipped, edged, and marked along the keels with light horn-colour. The basal pimples that support the scales of the adult are not apparent in the young animal.

The three young ones differed in size and in the proportional length of their tails, and, I do not think, were of the same birth. Only one of them was suckled by the mother. They seemed to be of different ages. A pregnant *Manis* that I once examined carried only one young one; and I do not think that they usually have more than one at a birth.

An adult male from Formosa is about a third larger than the ordinary run of Amoy specimens. It has longer, narrower, and darker scales; and those on the legs are compact and imbricated down to the toes. I at first thought that this "Tayowan Devil," so called by the early Hollanders, was of another species; but I can detect no differences in its skull. The size and colour of the scales I find very variable. The dark colour of the Formosan specimen is like that of the young Amoy animal. This may be owing to the difference of the earth in which it lives. The Amoy and Formosan adult skulls both have complete malar arches; but in the skulls of the Amoy young ones these gape apart, the unossified cartilage between having

been cleaned away. The Formosan *Manis* is constantly of a much larger size than the South-China animal; and it is not unlikely that on further study it will be found to be distinct.

The adult Amoy male above referred to I have placed in the College-of-Surgeons, and the rest of my series are in the British Museum.

A note on the behaviour of this animal in confinement will be found in the 'Zoologist' for 1858 (*l. s. c.*).

The *Manis* is not uncommon in many parts of Formosa, is abundant in the neighbourhood of Amoy, Swatow, and southern parts of China, extending to Hainan. How far it ranges north I have not ascertained.

Cetacea.

80. Delphinus (Steno) chinensis, Osbeck. (South-China White Porpoise.)

Delphinus (*Steno*) *chinensis*, Flower, Trans. Z. S. vii. part 2, p. 151; Swinhoe, Zoologist, 1858, p. 6226.

This white Porpoise, which Professor Flower has so ably described (*l. c.*), is to be seen in all the rivers of South China, and probably extends into the Yangtsze, where white Porpoises occur as far up as Hankow (750 miles from the sea). Above that port, and on to Ichang (1110 miles from the sea), we noticed a smaller and apparently different form, also white in colour. I have been told that black Porpoises occur at the mouth of the Shanghai river, and I have myself seen a school of small black Dolphins at sea north of Amoy (Swinhoe, 'North-China Campaign,' 1860, p. 10); but beyond their occurrence I know nothing more of them. I have never seen Porpoises of any kind off the coast or in the rivers of Formosa.

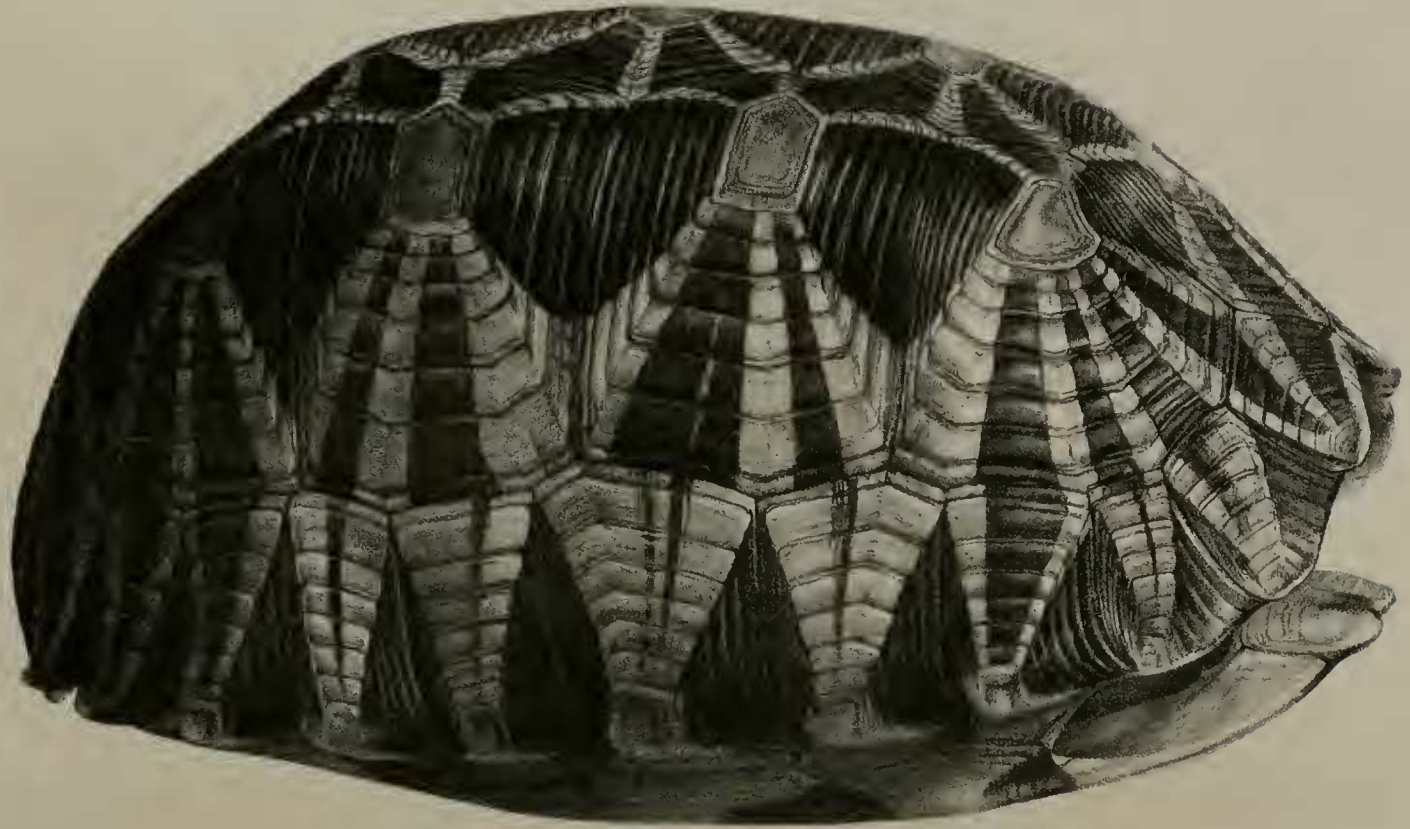
81. Balænoptera swinhoii. (Swinhoe's Fin-whale.)

Balænoptera swinhoii, Gray, P. Z. S. 1865, p. 725.

A large Finner-whale was cast on the sands of Formosa two miles below the port of Takow in 1862. In 1864 I collected all the bones of it that remained, and sent them to the British Museum. On view of these, Dr. J. E. Gray has established this species. Since then some more remains have been collected and sent home. This Whale resorts to the Hainan seas in winter, where the Chinese pursue it for the oil it yields. In summer it occurs in the Namoa straits and off the Port of Swatow. A party of Americans thought to establish a fishery at Swatow, but after one or two captures they gave up the scheme. They found the Whale useless for their purposes.

82. ?Megaptera kuzira (Temm. & Schl.). (South-China Small Finner.)

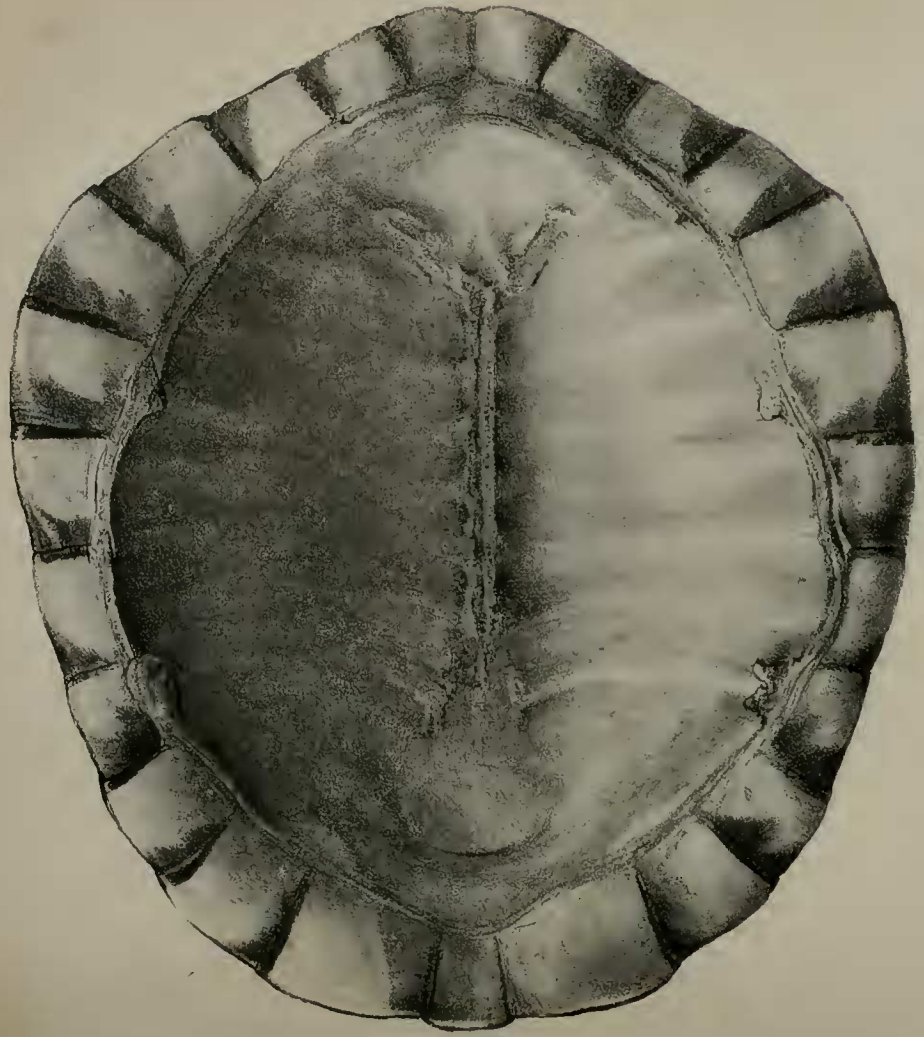
One day at Takow in March 1865 I was roused by the cry of "Hai-yang" (or Whale), and heard that one had just been stranded. I crossed the harbour and made for the spot. On the road I met several parties of Chinamen returning laden with portions of the poor monster. On arriving at the spot I found little left beside the jaw and a part of the back; and even these were being hacked and

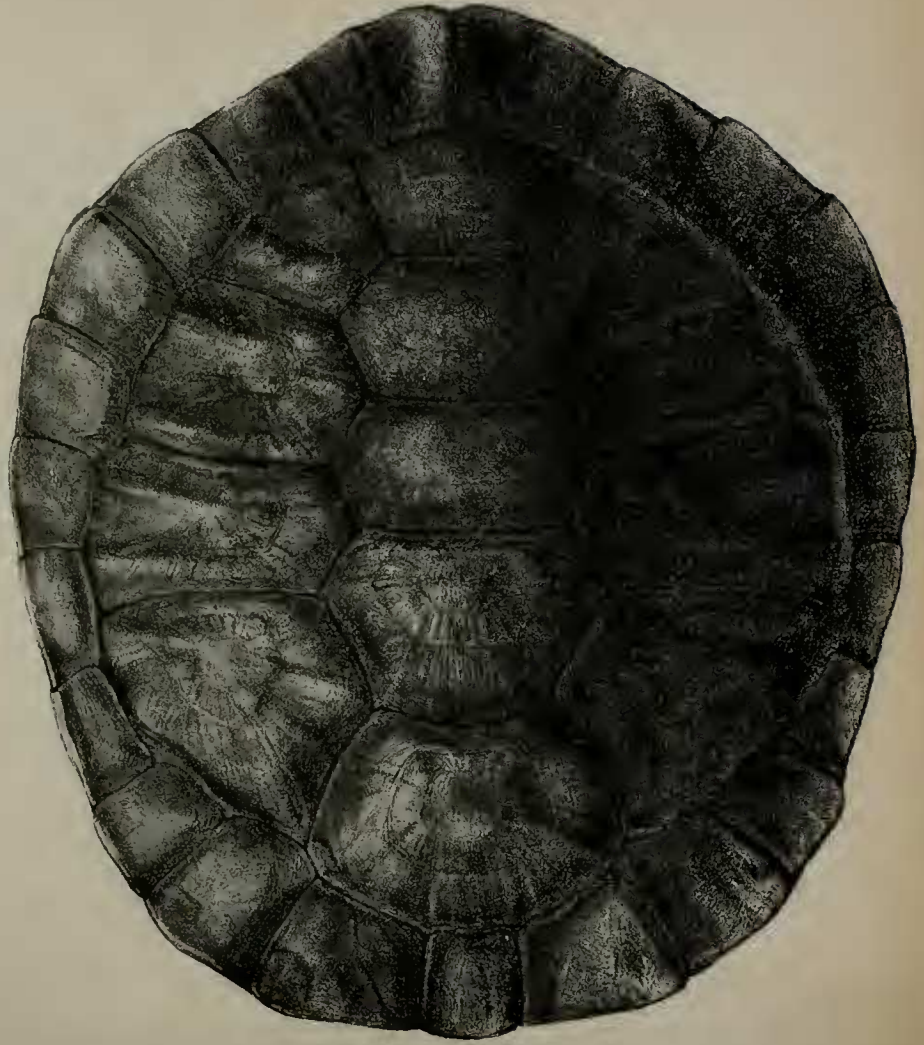


G. H. Ford

Mintern Bros. imp.

PELTASTES.—PLATYNOTUS.





G.H.Ford

W.West imp

fought over. The creature must have been either sick or foolish; for it wandered close to the shore just round the rocks at the entrance of the small harbour. A Manillaman observed it, and, getting a hammer, rushed into the water and struck it a severe blow on the head. He then hailed some Chinese to assist in getting it ashore. It measured, I was told on tolerably good authority, about 20 feet, and had no fin on its back. I saw parts of its belly, and observed that it was plaited across. Its colour was of a leaden black above, and whitish beneath. I saw one man carrying away its pectoral flippers, and two others its tail. I seized a piece of the baleen and sent it to the British Museum, but it unfortunately never reached its destination. Viewed exteriorly, it was like a high comb, the teeth (so to speak) being about 3 inches high and set about one-sixth of an inch apart, worn into bristles at their tips. Viewed from inside, you saw nothing but close-set whitish coarse hairs or bristles. Examined separately, each plate of baleen was shaped like a lob-sided triangle leaning outwards, coloured blackish blue like ordinary whalebone, and broken up at the top for about an inch, and to a less extent along the inner edge, into coarse whitish hair. The width of each plate at the base was 1·25 inch. There was a sheen of purple about the dark parts of the animal, especially on the flippers and tail.

The gunboat 'Flamer' came into Takow a day or two after the occurrence above related; and her commander, Lieutenant Eaton, told me that he had met a large number of small Whales between our port and the Pescadores. He mistook them for a long line of breakers where the chart showed no shoal. He kept away, fearing that there might be some mistake in the chart, when some of the brutes began to throw their tails and cut antics in the water. He then saw that the danger was nothing more than a school of Whales. He said there must have been about fifty, most of them averaging 20 feet or more. He did not observe that they had any fin on the back. They spouted water.

From the nature of the baleen, our species must belong to the Balænopteridæ; and from the shape of its flippers and want of a conspicuous dorsal fin it must be a *Megaptera*. It is probable that it will be found to be the same species that occurs in the seas of South Japan.

10. Notes on Tortoises in the British Museum, with Descriptions of some New Species. By Dr. J. E. Gray, F.R.S. &c.

(Plates XXXIII., XXXIV.)

The genus *Peltastes* in my paper on Tortoises, read in March 1869*, contains many species which are not well defined; and therefore I

* See P. Z. S. 1869, p. 171.

have sent to the Society a synopsis of them, founded on the examination of the specimens in the Museum.

* *Dorsal and ventral shields with pale and dark rays; nuchal shield none.* India.

1. PELTASTES STELLATUS.

Thorax ovate, convex; dorsal shield grooved, with nine, fifteen, or more yellow rays; the lateral rays of the costal shields nearly parallel; marginal shields with four or more yellow rays; sternum black, or dark brown, with numerous nearly uniform yellow rays; nuchal plate none.

Testudo stellata, Gray, Cat. Shield Rep. p. 7.
T. elegans, Günther, Rept. British India, p. 4; P. Z. S. 1869.
T. geometrica, Hutton, Journ. As. Soc. Beng. vi. 1837, p. 689, t. 38.
T. megalopus, Blyth, Journ. As. Soc. xxii. 1865, p. 624.
Hab. Scinde (*Dr. Leith*); Ceylon; Himalaya (*Captain Boys*).

Var. 1. *actinoides*. The dorsal shields more or less convex, with fifteen or more yellow rays.
Testudo actinoides, Bell, Zool. Journ. vol. iii. p. 419, tab. xiv., Testudinata, tab.; Seba, vol. i. p. 126, t. 80. f. 3.
T. stellata, var., Gray Cat. Shield Rep. p. 7.

Var. 2. *elegans*. Shields black, with twelve rays; costal shields with eight or nine rays.

Young. Areolæ of shields brown, large, four- or five-rayed; sternal shields with a pale areola, and more or less broad black pale-rayed margin.
Testudo elegans, Schœpf, Testud. t. xxv. figs. 1, 2, 3 (copied Shaw's Zool. ii. t. vi.); Schweigger, Prodromus, p. 86.
T. stellata, Schweigger, p. 56; Gray, Syn. Rep. p. 12, t. 1. f. 1.
La géométrique, Lacépède, p. 137, pl. ix.; Seba, Thesaurus, vol. i. p. 126, t. 80. f. 8.
Hab. Ceylon and Scinde.

Var. 3. *maura*. Shell very black; costal shields with six or seven white rays. B.M.

Young. Shields black, with a yellow four-rayed cross on the costal shields. B.M.

Var. 4. *sebæ*. Shell young; shields yellow; areolæ large, pale, with a black spot on the upper and lower margins and a long spot on the side margin over the suture between the shields; marginal shields pale, with a very narrow dark front margin.
Seba, Thesaurus, vol. i. tab. 79. fig. 3.
Schweigger changed the name of the species because he did not believe that the Tortoise figured by Seba was the young of the same species. See 'Prodomus,' p. 86.
The specimens with many and with fewer rays are very distinct from each other; and I have not found any specimens which seem to

unite them. I was at one time inclined to regard them as species; but in the British-Museum series of the species are specimens of both varieties sent by the same persons from Ceylon, Himalaya, and Scinde, which makes it appear as if they were found intermixed together.

Schweigger did not consider Schœpf's specimen of the young animal (which is very characteristic of the fewer-rayed variety) the same as the specimen which he described; and therefore he changed the name to *stellatus*. Dr. Günther refers to Schœpf's figure without doubt, and to Schweigger's *Testudo stellata* with doubt (R. B. I. p. 4).

** *Dorsal shields with pale and dark rays; ventral shields not rayed; nuchal shield none.* India.

2. Peltastes platynotus. (Plate XXXIII.)

Thorax oblong, flat, with six broad uniform pale rays; areolæ uniform pale brown; marginal shields with a brown marginal areola, and two pale rays; sternum yellow, varied with black near the front or hinder margin of the shields, not rayed; underside of marginal shields with a very small marginal spot on the front edge.

Testudo platynotus, Blyth, Journ. As. Soc. xl. pp. 70–79; Theobald, Proc. Linn. Soc.

T. elegans, var., Günther, Rept. Brit. Ind. p. 5.

Hab. Burmah.

Blyth describes the flatness of the back as a peculiar character of the species; but it is only to be observed in one out of the three specimens in the British Museum; and he does not mention the plain underside, which is found in them all.

*** *Dorsal shields pale- and dark-rayed; nuchal shield distinct.* Africa.

3. Peltastes geometricus.

Thorax oblong, dorsal and upper edge of marginal plates black; areolæ small, of costal plates submarginal; costal plates with ten or more white rays; upperside of marginal plates with three or more white rays; sternum brown-varied, of the older specimens more or less pale-rayed on the lateral margins; underside of marginal plates pale, with a black streak on the front edge; *nuchal shield elongate, slender*; the vertebral plates more or less convex, sometimes elevated, tent-shaped.

Testudo geometrica, Gray, Cat. Sh. Rep. p. 8.

Peltastes geographicus, Gray, P. Z. S. 1869.

Var. 1. Shields conical, prominent.

Testudo geometrica, var. *tentoria*, Gray, Cat, Sh. Rep. p. 8 (not Bell). B.M.

Var. 2. The margin of the sternal shields black, yellow-radiated.

Hab. South Africa, Cape of Good Hope.

4. Peltastes tentorius.

The back of the shell black, with twelve or more narrow rays; underside white, with a large brown spot occupying the middle of the whole length of the sternum; underside of anterior and lateral marginal plates white, with a black anterior ray; posterior marginal shields all white; nuchal plate very small.

Testudo tentoria, Bell, Zool. Journ. iii. p. 420, t. xxiii. & xxiv.; Testud. t.

T. geometrica nigriventris, Gray, Cat. Sh. Rep. p. 8.

Hab. South Africa.

5. Peltastes verreauxii.

Shell depressed, chestnut-brown, broader and slightly dentated behind; dorsal shields with narrow black-edged radiating streaks; areola small, black, and pale-varied; sternum brown, especially in the middle of its length; sternal shields with diverging pale rays, especially on the margin; nuchal shield small.

Testudo verroxii, Gray, Cat. Sh. Rep. p. 8.

Hab. South Africa.

6. Peltastes semiserratus.

Thorax oblong, the hinder margin more or less serrated; dorsal shields black, deeply concentrically grooved; areola pale, large, subcentral, with a pale-brown broad radiating band, which sometimes becomes very wide, and often divides into two near the margin of the plates; the central ray of the vertebral and costal plates forms an uninterrupted streak on the back and sides; the marginal shields with one or two broad pale rays; the sternum white, with a few very broad black rays; nuchal plate elongate, triangular.

Young. Hinder edge very acutely serrated.

Var. Back depressed.

Testudo semiserrata, Gray, Cat. Sh. Rep. p. 9.

Hab. South Africa.

**** *Dorsal shields horn-coloured, black-varied; nuchal plate distinct.*

7. Peltastes elongatus.

This Tortoise is very variable in colour; some older shells are nearly uniform in colour, some others are nearly black, with a more or less pale edge to the dorsal and ventral shields; others are pale whitish, with a more or less broad black ring round the areola.

Testudo elongata, Gray, P. Z. S. 1856, p. 181, t. 9, and 1861, p. 139; Ann. & Mag. Nat. Hist. 1861, p. 218; Günther, Rep. Brit. India, p. 8; Blyth, Journ. As. Soc. vol. xxii. p. 639, xxiv. pp. 7–12, xxv. p. 448, xl. p. 75; Theobald, Journ. Linn. Soc. Zool. vol. x. p. 6, 1868.

Hab. India.